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AMERICAN AND OTHER PATENTED INVENTIONS.

DECEMBER, 1834.

A Sketch of the origin, progress, and improvement, of Steam Navigation, in the Port of London, from 1814 *to* 1824.

(Continued from p. 90.)

The spring of 1817 was marked by the most disastrous steam packet accident in England. Messrs. Aggs & Curr, whom we have noticed before, (see Defiance,) had built a second vessel, called the Courier, to run on the Warrsum river, between Norwich and North Yarmouth; this vessel was fitted on the high pressure principle, the engine and boilers arranged, in other respects, nearly the same as those of the Defiance. On the 4th of April, this vessel was just about starting, when she blew up, and unfortunately killed several people, among them the engine man, besides maiming and scalding several others. A survivor stated to Mr. Aggs, that the engine man had just previously boasted, "*that he would get his steam well up, and give her a grand start.*" The vessel was almost entirely destroyed; the cylinder boilers had separated in the middles, and the ends flew in opposite directions. The loss of life and property on this occasion, caused a deep sensation throughout the country; the House of Commons instituted an inquiry into it, and some scientific engineers—among them Mr. Brunet, Mr. John Martineau, of the firm of Taylor and Martineau, and we believe Mr. Joshua Field, of Mr. Maudslay's establishment—held a sort of court of inquiry, and were subsequently examined before a committee of the House of Commons, together

with several others, whose knowledge, testimony, or opinions, might be supposed capable of assisting the object of the inquiry. The result was, that the committee reported a bill prohibiting the use of high pressure steam engines, in vessels, and directing a severe test of the strength of boilers, used for such purposes.

During the year 1817, several other steam vessels had been introduced into the port of London, but none of sufficient importance to claim a place, in an abstract, intended to show by whom such improvements were made, as have a material bearing on the present state of steam navigation.

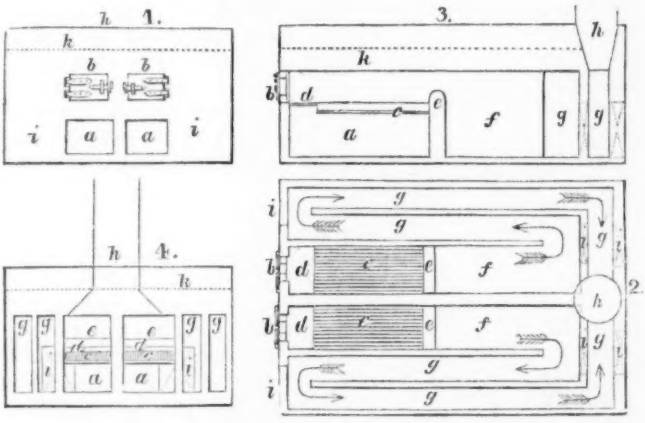
From general principles, confirmed by experience, it was manifest that the quantity of steam generated, did not depend on the size of the boiler, or the quantity of water or steam chambers it contained, but entirely on the surface the fire had to act upon, within the flues surrounded by water, before its exit by the chimney. In many of the early steamers, this principle was lost sight of, and the products of combustion were permitted to escape so directly, that some of those in the Thames were threatened with indictments as nuisances, on account of the coal, sparks, and cinders, ejected from their chimnies, among the thickly congregated vessels near the city of London.

This fault did not exist in the Regent; the length of internal flue, passing through the water, and the construction of the furnaces, preventing it: the cinders or sparks had to travel so far, before they reached the vertical chimney, that they fell, by their own gravity, to the bottom of the flue, or pit, behind the furnace. The width given to the dead plate, just within the doors of the furnace, likewise caused the coal to be partly coaked, before it was finally burnt, and the gas thereby extricated being carried over the ignited fuel, accompanied by a small current of air, admitted between the two parts of the double furnace doors, was consequently immediately ignited, and passing through the flues in a long narrow sheet of flame, thus added to the internal heat, decreasing the smoke, and saving the fuel.

So effective was this mode in practice, that the Regent would frequently run from eighteen to twenty minutes, with only a thin white vapor issuing from the chimney, whilst her contemporaries were uniformly exhibiting a long, thick, black pennant of dense smoke. Her consumption of coals for a ten hours' run, including getting up at starting, was about 7,500 lbs. weight, or ninety bushels Winchester measure.

This mode of construction, until after the burning of the Regent, was supposed to be a sufficient protection to the deck of the vessel, through which the chimney rose. The discussions on that subject led the late superintendent of that vessel, to suggest the insulating the chimney itself from the boiler, for a few feet above deck, by a ring of water, within an exterior jacket, round the chimney, to be fed by a small pump with the warm water from the air pump cistern; the heat thus abstracted from the chimney tube being accumulated in the water, the latter was forced into the boiler by a second pump. Mr. Brown carried this plan into operation in fitting up the Caledonia, and the attendant success caused it to be generally adopted during

the succeeding winter. This is now a regular portion of the equipment of an English steamer, though, lately, some have thought proper to employ an air tube only around the chimney.



The diagrams 1, 2, 3, 4, will illustrate the foregoing remarks. 1 is the boiler front; 2, the plan of the pits and flues; 3, a longitudinal, vertical section; 4, a vertical cross section; *a*, the ash pits; *b*, the fire doors; *c*, the fire bars; *d*, the dead plate; *e*, the bridge of the flue pit; *g*, the flues; *h*, the chimney tube; *i*, openings to clean the flues and pits, to water line. This was the general construction adopted in the Caledonia, and it has since continued to be the one most approved. There have been, however, some variations, the most important of which will be noticed in the course of our remarks.

We now resume our narrative for 1818, beginning with the Victory. This vessel was about 110 feet by 23, was fitted with two thirty inch cylinders, of three feet stroke, acting each by a cross head, and side rods extending to two inverted bell-crank beams, connected to a middle shaft, having a pair of right angled cranks, one on each end; these were connected by a pair of crank links, to the cranks on the wheel shafts; the other dimensions of these engines were not taken by the writer. The boiler was of a low wagon form, having two eliptical furnaces and upper flues returning to the chimney. The engine was, unfortunately for Dodd who arranged the plan, very disproportionate in its parts; and the owners had committed the error of employing Dickson to build it, because he offered to do it for £1200 less than Boulton & Watt, and £1000 less than Maudslay. Thus cramped in price, and not having tools or machinery to do such engines justice in making, Dickson's workmanship added to the evils of Dodd's arrangement; and in four months after its beginning to work, one of the owners admitted, publicly, that Dickson's bill for repairs came to £800. The consumption of coal was great, and the wheel

shafts, being of cast iron, occasionally broke, from a cause which we are now to explain.

It was an unsettled point, whether a steamer was best, built with a plain side, and wheel guards formed by the prolongation of the deck beams, supported by knees and braces, or built with these, and a fitting out beneath the guard. Where these latter had been adopted, the vessels had scuttles from the deck, which converted the spaces below into store lockers, for loose and small articles.—These had been built on after the vessel was otherwise finished, and were called sponcings. Where steam vessels had been built on the first plan, the cabins had had the best light and air, by means of the side ports. Dodd proposed to fit the Victory with these advantages united, by building the sponcings as a component part of the vessel, by which he gained light and air, and also space to fit additional tiers of sofas, or lounges, which, in a crowded day-vessel, were great additional conveniences. But, in trying to avoid his errors in the Majestic, he fell into the opposite extreme, and the Victory was too slightly built to stand the sea she frequently had to encounter between the mouth of the Thames and Margate; the form of the sponcings, also, caused her motion, in rough water, to be a succession of jerks, alike injurious to the frame of the vessel, and to the machinery, but particularly to the cast iron wheel shafts.

The Victory, when in good case, and in fair weather, was an equal match for her competitor, the Favourite, the next to be noticed in our narrative. Each made its average passage in about seven hours, and they were believed to exceed nine miles an hour in speed. The Favourite was not materially different in size from the Victory, though somewhat smaller. The main differences were in the form of the vessel's cross section, which, although it did not allow of so much internal accommodation as the Victory, prevented those jerks to which she was subject in rough water; and in the engines, which being constructed on the principles already elucidated in our description of the mode adopted by Messrs. Boulton & Watt, in the Caledonia, gave her yet further material advantages over the Victory in bad weather. Still, notwithstanding this general superiority over the Victory, the Favourite occasionally broke a cast iron wheel shaft; an attempt was made to prevent this, by substituting hollow cylindrical shafts, of larger size, containing about the same weight of metal as the original solid shafts; these stood better than the solid, but, breaking at last, it became manifest that a wrought iron shaft could alone be depended on for a sea vessel; and both of them were thus equipped, during the following winter.

When about building the steamer called the City of Edinburgh, Boulton & Watt had been associated with Messrs. Wagram & Co., ship-builders in London, whose business had hitherto consisted mainly in the building of large ships for the East and West India trades; and these gentlemen having taken shares, claimed a voice in the construction, and, contrary to Mr. Wager's advice, are said to have insisted on a more bulky form, and increased strength in materials,

beyond any former practice, preferring to sacrifice considerably in speed, that there might be no failure in safety, under the strain of a powerful pair of steam engines, when contending against the singular agitation caused by a storm, in the German Ocean. Subsequent experience showed the errors of this otherwise correct feeling, to have consisted in the excess to which it was carried.

Much caution was used, to prevent strangers from learning the real sizes and proportions of her engines, but they had about thirty inch cylinders, with forty inches stroke; the paddle wheels worked as in the Caledonia, having two revolutions for each three whole strokes of the engine, and were about fourteen feet in diameter; this vessel, it is said, never reached a speed, in still water, quite equal to eight miles per hour. On taking her station this year, in the passage trade between London and Leith, her average passages were about seventy-five hours; and by offering a safe, and tolerably certain, steam communication, with London and Edinburgh, she received a good share of public favour. Her guards were fitted with projecting beams, not extending the whole length of the vessel's sides, and they were blocked by small sponcings wrought on. She had two schooner-rigged masts, with fore and aft sails, on each, and a square-sail to set forwards, but was not in any other way peculiar in her construction.

[TO BE CONTINUED.]

The Hydrostatic Paradox.

BY THE EDITOR.

When a gentleman allows his name to go before the public as the inventor of something new in mechanics, however grossly he may sin against the laws of nature, in the principles which he assumes, we are compelled to suppose that he is sincere, and self-deceived. The quack in medicine may or may not believe in the virtues of the nostrum which he prescribes, and even should his patient die, this may result from his own perverseness, and not from any fault in the panacea; not so, however, with mechanics; if a perpetual motion makes a dead stand, it appears before us self-condemned; and so of machinery in general, when it has been made by a competent workman, on a scale sufficiently large, we may then learn what it will, and what it will not do. This, fortunately, however, is not the only guide; there are certain known principles, a connexion between effects and their causes, which have been fully investigated by the instructed mechanician, and which serve him as land-marks in all his proceedings; when an individual is not under the guidance of these principles, he may, by accident, take the right road; but the chance is, that he follows some "Will with a wisp," and finishes his journey in a quagmire.

The good citizens of New York, on the 23d of September last, had their attention invoked to a magnificent scheme for obtaining motive power, in a way so cheap, so safe, and so efficient, as to *promise* to

supersede all the expensive and elaborate means now in use; and "it is not known that this has ever before been effected, either in this country, or in Europe." By the use of the word "before," we might be led to suppose that the Rev. Mr. Edson has not merely conceived the idea in his own mind, but has actually tested its correctness; but, most assuredly, this term has been used prematurely. He may have "seen visions," or "dreamed dreams;" but, like some other dreams, they must be interpreted by "the rule of contrary." Although the things proposed have never been "effected, either in this country, or in Europe," there have been numerous schemers, who have seen fortunes in reversion, which they were to derive from the application of this paradoxical power; but, as "dead men tell no tales," so also the still-born children of mechanical genius never cry, and are soon buried.

We have written this long preface to the subjoined notice, in consequence of the application of a gentleman in New York, who had simultaneously been engaged in a similar scheme, and who was led from this publication to fear that he might meet with a rival in his enterprises; but for this, we should have passed over this magnificent announcement, as we do numerous others, every year, which make their first appearance in the daily journals, and are never more seen upon the stage. Should our friend be anticipated in the trial of the experiment, we shall congratulate him on two accounts, at least—the saving of money, and the saving of reputation.

From the New York Daily Advertiser.

Messrs. Editors,—The Rev. Ambrose Edson, of Berlin, Conn., having been laid aside from his professional labours, in consequence of a bronchial affection, has recently directed his attention to the subject of Hydrostatic Pressure, and has succeeded in devising a method for the application of this powerful principle to propel machinery. It is not known that this has ever before been effected, either in this country, or in Europe. The extent to which the power of the Hydrostatic Pressure may be carried, may be understood from the simple statement of the fact, that, by it, a single *pint* of water may be made to produce a pressure equal to ten, twenty, sixty, or one hundred tons weight, according to the proportional dimensions of the apparatus used for the purpose. Indeed, the only limit to the extent to which this pressure might be carried, results solely from the impossibility of finding any material of sufficient strength to confine it. In the inventor's application of a principle of such tremendous power, (hitherto almost entirely useless to the world, except in the construction of the Hydrostatic Press,) to machinery, but a very small quantity of water is used for the largest factories—the whole of which may be taken from any common well, and after being used once, it is conducted to a reservoir, from which it is again taken, and applied in the same manner, and the repetition continued for any length of time desired. No additional supply will be needed, except to make up the deficiency of what evaporates, and leaks out, from day to day.

It will readily be perceived, that by the improvement introduced by such an application of the hydrostatic power, running streams, with head and fall, are not necessary even for the largest mills and manufacturing establishments. These may be erected on the surface of the smoothest and smallest ponds, or pools of water; nay, even at a distance from *these* conveniences, or any elevation of land, whereon water can be procured in wells sufficient for ordinary domestic purposes. On the score of *economy*, too, this new application of a principle long known to the world, will have much to recommend it. The enormous sum sometimes paid for a valuable water privilege, will be saved, as well as the expense of erecting, and keeping in repair, dams, flumes, water wheels, &c., even where water power, in the common method, can be obtained. Its advantage over *steam* power, too, is obvious, as it requires no *fuel* to produce, and sustain, a pressure equally great, less violent, and much more easily managed, without *any risk of life and property by the explosion of boilers.* It is, evidently and literally, A COLD WATER PRINCIPLE. Hence, "*Hydrostatic Pressure Boats*" will have a decided advantage over steamboats, arising from the perfect safety of using the power, the saving of all the expense incurred for producing and supporting steam pressure, and also the fact that a Hydrostatic Pressure Engine will be much less expensive than a steam engine.

It is expected that the citizens of New York may have an opportunity of testing the correctness of the foregoing statements, by a personal examination of a model of a Hydrostatic Pressure Engine, in the course of a few weeks.

CONNECTICUT.

Remarks on the Syphon. By THOMAS EWBANK, *of New York city.*

TO THE COMMITTEE ON PUBLICATIONS.

GENTLEMEN,—Since writing the communication respecting the syphon, which was inserted in the July number of this journal, I have devoted some leisure to the same subject, upon which I now submit to you a few remarks.

The following observations apply to the form of syphon described, page 3, in the communication above referred to.

It occurred to me that this syphon might be occasionally used in the arts, with advantage, as a *cock*—in oil and starch factories, breweries, sugar works, &c. For example, suppose it were attached to a standing cask, the smaller leg being connected either to the lower part of its side, where a cock is commonly placed, or inserted through the top: when it is charged, by lowering the straight tube, any required quantity of liquid is discharged, and it is instantly stopped by sliding up the tube. Some simple contrivance for retaining it there, may be easily attached to the upper part of the cask. The discharge also may be increased or diminished, by lowering or raising the straight tube.

In this manner it acts as a cock, and with one peculiar advantage, for it is neither liable to leak, or get out of repair.

It is also a *gauge* for ascertaining, at all times, the quantity of liquid in the vessel to which it is applied, viz: by indicating the surface of the fluid; thus, by gently lowering the straight tube, till the fluid begins to flow, its surface in the vessel, and in the straight tube, (or the aperture of the spout, if it be straight,) will be on the same level. In vol. ii. of the Journal, page 414, is a description of a gauge for stand casks, from the "Transactions of the Society of Arts." It consists of a glass tube connected to the cock at the bottom of the cask, and extending to the top of it; the surface of the liquid being on the same level in both. This syphon will answer both the purposes of the cock and gauge in that apparatus.

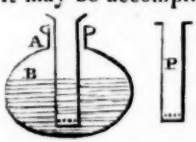
It has, however, one prominent disadvantage, when used either as a cock or syphon; for it requires a space sufficient to receive the movable tube, as far below the bottom of the vessel, as is equal to the depth of the fluid in it.

When the depth of the fluid to be withdrawn, is such as to reach up to within, or about three inches of, the bend, (of the small syphon sent,) it may be used *without* the movable tube. In such cases, close the orifice of the *small* leg with the finger, and place the large leg into the liquid, as above; then withdraw the finger *suddenly*, and the liquid will rise to be discharged through the syphon. As this effect is owing to the sudden expansion of the air, it is necessary to withdraw the finger at once, otherwise the air, by expanding gradually, would not produce the same effect. Possibly a greater rise of the fluid may be obtained by altering the relative proportions of the legs. Such would, in some degree, be the case, if the syphon were formed of glass. In speaking of the syphon of M. Collardeau, (p. 336, vol. ix.) I ought, in my last communication, to have mentioned that my experiments were made with syphons formed of leaden, tin, and copper tubes; had I used those made of glass, the effect would doubtless have been the same as is described by himself.

There are two other methods of charging this kind of syphon, without the movable tube, but they are not likely to be of any practical utility. As they may perhaps be considered as adding to the variety of modes of using this instrument, I submit them to your consideration.

1. If you take hold of the middle part of the small leg, and plunge the other into the liquid, which must be within three inches of the top of the vessel, it will be charged. In doing this, the large leg should describe an arc, the centre of which will be the part held in the hand. It is performed much readier in this manner, than in plunging it perpendicularly. It requires some address, but is easily done, when the art is once acquired.

2. When the fluid is too low in the vessel to be discharged as above, it may be accomplished to a limited extent, thus:



Suppose A the vessel, and B the surface of the fluid in it. P is a pipe closed at the bottom, but perforated with a number of small holes, the sum of whose areas must not exceed that of the orifice of the small leg of the syphon. The large leg is made to slide easily into P, and, at the

same time, to fill it. P is then placed into the vessel, as represented, and the fluid, passing through the small holes, stands at the same height in it as in the vessel. The large leg is quickly dropped into P and the fluid displaced by it will rise and charge the syphon. If the large leg be placed gradually into P, no effect would follow, because the fluid would have time to descend to its level through the small holes.

Another mode of using the syphon for transferring acids, occurred to me, and which I have found to answer. You are aware that the silversmiths make small syphons for withdrawing wine from bottles, &c., which are frequently accompanied with small exhausting syringes, for the purpose of charging them. The one proposed has a substitute for this syringe.

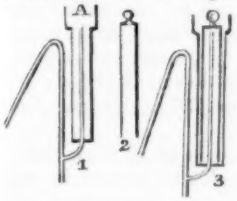


Fig. 1 represents a common syphon, with a small tube attached to its longest leg, similar to the common sucking tube. It is made to pass through the centre of a larger tube, A, which is closed at the bottom. This tube is filled with water (or other fluid) to the top of the small tube. 2 is a tube closed at its upper end. Its internal capacity should be about twice as great as that of the syphon. It is made to slide in the tube A, as shown at 3. To use it, fill A with water, then place the short leg into the liquid to be withdrawn; after which, close the orifice of the other leg with the finger, and raise the tube 2, till the syphon is filled; then let 2 descend as at 3.

Examination of Dr. Herschel's Theory of the Constitution of the Sun. *By* V. Value.

The sun, the acknowledged centre of our planetary system, offers such an important subject of contemplation, that it has always excited the admiration, wonder, and gratitude of mankind. As it is, for us, the focus of light and heat, it was natural enough to consider it as a globe of fire, as a mass of ignited matter, from which we derived the most important benefits; and therefore we find it, as the soul of the universe, worshipped from the remotest antiquity. In the eyes of its adorers, it was the deity itself, and, without presuming to investigate the nature of its constitution, they supposed it to be self-existent, and, of course, eternal, incombustible, indestructible. When the knowledge of the true God taught mankind to look upon the sun as the work of his hands, that luminary became mere matter, and, of course, a proper subject of investigation. One of the first and most obvious inquiries was, *By what means could such an immense fire be fed?* However easy and natural the question might be, its solution did not the less remain a mystery for us. We felt the genial warmth of the sun, and could not, without rejecting the conviction of our senses, consider it otherwise than as a globe of fire. Hence, conjectures, hypo-

theses, theories, succeeded each other, to establish its fiery nature; ingenious and learned calculations were made, to show that the immensity of that globular furnace could, without any sensible diminution, supply the inconsiderable quantity of light and heat it diffused around. So that, with the universal consent of Italian, German, Prussian, English, French, and American astronomers, the sun was considered as a globe of fire, until, in 1794, the learned and indefatigable Dr. Herschel, with one powerful effort of his gigantic genius, deprived it of its inflammability, and converted it into an opaque body. In the 16th century, (1530,) the crystal heavens of Aristotle had melted away under the calorific power of the sun, as the centre of our planetary system; in the 18th, that luminary was divested of its very caloric. So fluctuates human wisdom!

My intention is to present a few observations on the theory advanced by Dr. Herschel. As, in every new elementary book, it appears to be presented without comment, and, of course, as the most probable conjecture, it is well, perhaps, to examine its bearing.

In the London Philosophical Transactions, for 1795, Dr. Herschel has given an explanation of his views.

He says,—"The sun, like the planets, is an opaque, or dark body, surrounded by a vast atmosphere, containing clouds created by the constant and extensive decompositions of its elastic fluids; and that those clouds are of a phosphoric nature, and attended with lucid appearances, by giving out light." But he supposes that the rays emitted by that luminous substance contain no heat, because, if they did convey all the heat we feel, they ought to act with more effect when their course is less interrupted, viz: on the tops of high mountains; we know, however, from observations, that these are constantly covered with snow. Moreover, the intense cold experienced by æronauts who have ascended to any considerable height, corroborates the hypothesis that the rays of the sun are divested of caloric.

Hence, the Doctor thinks that we receive light, not from the opaque nucleus of the sun, but from its luminous atmosphere, and that the rays which convey that light contain no heat, when they emanate from it. But when and how do they receive the heat they undoubtedly communicate to us? The Doctor very ingeniously explains it thus:

"Heat is produced by the sun's rays only when they act upon a calorific medium; they are the cause of the production of heat, by uniting with the matter of fire which is contained in the substances that are heated, as the collision of flint and steel will inflame a magazine of powder, by putting all the latent fire it contains into action."

The unavoidable conclusion to be drawn from what precedes, is, that the solar rays contain light, but no heat; that they traverse the immense distance, the 95,000,000 of miles that separate us from the sun, and reach the tops of our highest mountains, without experiencing any alteration; and that they could, unchanged, go to any given distance, even to Sirius, or the remotest of the fixed stars, for no alteration can take place in them, except they find a *calorific medium* with which

to unite. That calorific medium is, with the earth, and, we may presume, with every other planet, the denser strata of the atmosphere.

From the Doctor's premises, viz: that the sun's rays carry no heat, but that they receive it from our atmosphere, we infer, that—

1. The solar rays, on account of their obliquity, in the morning and evening, ought to disengage more heat than at noon.

2. That, for the same obliquity, the heat ought to be more intense in winter than in summer.

3. That the light from the fixed stars ought to produce as much heat as the sun's, if not more.

4. That the planets ought likewise to impart to us a degree of heat proportional to their atmosphere.

All these conclusions contrast so strongly with the unerring results of our experience, that they will be rejected at once. Yet, if fairly deducible from the Doctor's theory, they ought to be adopted, or else the theory should be discarded.

I will now proceed to show that these inferences are the natural consequences of the above hypothesis of Dr. Herschel.

1. The solar rays, according to the learned astronomer, are cold when they emanate from the sun; they shine upon the summits of our highest peaks, without acquiring sufficient heat to melt snow; and yet those rays, near the surface, will raise the thermometer to 120° Fahrenheit. That difference of heat must then be received in the passage through the denser portions of our atmosphere, and it must be, as the Doctor says, on account of "*uniting with the matter of fire therein contained.*" This is the important point.

Since those rays become calorific only when in contact with the denser strata of our atmosphere, it follows, that the longer that contact continues, the hotter the rays must become. Hence, when the sun's rays fall obliquely, as they then receive the heat of a greater quantity of the *matter of fire*, or unite with a greater portion of it, they ought to be hotter. But is that the result? Experience is here in direct opposition to the theory. Every morning and evening, the rays fall in an oblique direction, and yet we know that the temperature is not then of the highest degree.*

2. The same reasoning applies with equal force to the position of the winter rays, their obliquity being greater in that season than in summer.

As our atmosphere is the chemical laboratory of heat, which is disengaged from it by *cold light*, is it not reasonable to suppose that, from whatever source we obtain that cold light, the result must be heat? If so,

3. The rays of light from the fixed stars ought, when in contact with our dense atmosphere, to produce a heat equal to the sun's rays.

This idea will seem so preposterous, it is so contrary to daily ex-

* On account of the same obliquity, the temperate zones should be more heated than the torrid, and the frigid zones still more than the temperate, whenever the solar rays reach them.

perience, that it will be instantly ridiculed. Yet it appears the unavoidable consequence of the new hypothesis. By it, light denuded of caloric, emanates from the sun's atmosphere, and flies in every direction, whether it goes one hundred miles, ninety-five millions, or one hundred billions of miles, its component parts must remain the same, until a proper medium of combination offers, and then, *heat* must be the inevitable result.

The fixed stars are suns, by the Doctor's own admission; their bodies must be opaque; but since they emit light, it must, like the solar light, be self-created; their atmosphere must, of course, be luminous and phosphoric, and, consequently, their light similar to the sun's. And, although that light traverses an immeasurable distance, it is yet unchanged when it reaches our atmosphere, and ought then to produce heat, on entering our denser strata.

But it may be said that the rays, sent by each individual star, are not sufficient to effect any change of temperature. Granting this, it cannot be denied that we receive, at the same moment, millions of millions of rays from the innumerable stars which adorn the firmament, and that their aggregate quantity must, at least, equal the sun's emanations to us, and ought, in consequence, to generate as much heat. Is not this a fair and natural deduction from the premises?

4. Since the *cold rays* disengage heat from our atmosphere, how does it happen that the moon's rays, coming through the same medium, (the generating medium,) do not produce a similar effect? Because, it will be immediately answered, it is a mere reflected light. Hence, we must admit two kinds of light—the sun's primitive light, and the moon's reflected, or secondary light. How do they differ? As long as the sun's rays were supposed to contain light and heat, it was natural to infer that, the heat being absorbed by the body of the planet, the reflected light could no longer retain it, and, of course, it was cold; but when the solar rays are, by the new system, deprived of caloric, being cold, how can they differ from the light of the planets? This is not explained by the Doctor.

Since we have no light of our own, if we reflect any, it must be the sun's. This will be readily conceded; but it may be said that it will be the sun's light, modified in its passage through our atmosphere. Let us examine this objection. The only modification light undergoes, is the accession of caloric. Hence, if the earth sends forth any light, it must be *heated light;* and, since there is nothing to interrupt its course between the moon and us, it must reach our satellite as it leaves us, viz: loaded with heat. We must then impart a considerable degree of heat to the lunar inhabitants.

What we have just said of the earth, and its reflected rays, is applicable to the moon, and to every other planet. Hence, their light ought to convey heat to us.

The consequence from the Doctor's premises would be, that the earth and planets send forth *calorific rays*, while the sun transmits *cold rays*. Such is the absurd, though inevitable deduction, the new theory would lead to—a conclusion wholly contrary to experience;

for the most accurate observations have proved that rays from the moon and planets produce no sensible heat on the earth.

If these inferences are correct, it is evident that the Doctor's hypothesis is erroneous, and that we must either re-adopt the old received idea of the sun being a mass of ignited matter, or else, admitting, with the celebrated astronomer, that light issues, not from the sun's nucleus, but from its lucid and phosphoric atmosphere, endow that light with heat, and then form some new conjecture or solution to explain why the solar rays do not heat the upper part of our atmosphere.

That solution appears almost self-evident, from the theory of atmospheric pressure in Turner's Elements of Chemistry, with notes, by the distinguished Professor, Franklin Bache, (page 153, 4th American edition.)

Information to persons having business to transact at the Patent Office.

DEPARTMENT OF STATE,
September 30th, 1834.

The Acts of Congress, of a general nature, which relate to Patents for Inventions and Improvements in the Useful Arts, are those of February 21st, 1793; April 17th, 1800; February 15th, 1819; July 3d, and July 13th, 1832.

Patents are granted for "any new and useful art, machine, manufacture, or composition of matter, or any new and useful improvement on any art, machine, manufacture, or composition of matter, not known or used before the application." [Act of 1793, sec. 1.]

The term for which a Patent is granted, is fourteen years. A patent cannot be prolonged or renewed beyond that term, except by a special Act of Congress.

Patents may be granted to *citizens* of the United States. [Act of 1793, sec. 1,] to *aliens* who shall have resided therein for two years, [Act of 1800, sec. 1,] and to *aliens* "who, at the time of petitioning for a Patent, shall be resident in the United States, and shall have declared their intention, according to law, to become citizens thereof." [Act of July 13th, 1832, sec. 1.]

A Patent granted to an alien of the description last mentioned, will be void, if the invention is not introduced into public use in the United States within one year; or if, for any period of six months after such introduction, it shall not continue to be publicly used and applied in the United States; or if the inventor shall fail to become a citizen of the United States at the earliest period at which he may be entitled. [Act of 13th July, 1832.]

Joint inventors are entitled to a join patent: but neither can claim one separately.

A Patent obtained surreptitiously, or upon false suggestion, will be set aside upon application to the proper court. [Act of 1793, sec. 10.]

In case of the decease of an inventor, before he has obtained a Patent for his invention, "the right of applying for and obtaining such a Patent, shall devolve on the legal representatives of such person, in trust for the heirs at law of the deceased, if he shall have died intestate; but if otherwise, then in trust for his devisees, in as full and ample manner, and under the same conditions, limitations, and restrictions, as the same was held, or might have been claimed or enjoyed, by such person in his or her life time; and when application for a Patent shall be made by such legal representatives, the oath or affirmation shall be so varied as to be applicable to them." [Act of 1800, sec. 2.]

"It shall be lawful for any inventor, his executor or administrator, to assign the title and interest in the said invention, at any time; and the assignee having recorded the said assignment, in the office of the Secretary of State, shall thereafter stand in the place of the original inventor, both as to right and responsibility; and so the assignees of assigns to any degree. [Act of 1793, sec. 4.]

On the Application for a Patent.

The application for a Patent must be made by petition to the Secretary of State, signifying a desire of obtaining an exclusive property in the invention, and praying that a Patent may be granted therefor, [Act of 1793, sec. 1,] which petition may be in the following form:

To the Secretary of State of the United States:

The Petition of — ——, in the County of ————, and State of ————, respectfully represents:—

That your Petitioner has invented a new and useful improvement in ————————, which has not heretofore been known or used; the advantages of which he is desirous of securing to himself and his legal representatives; he therefore prays that Letters Patent of the United States may be issued, granting unto your petitioner, his heirs, administrators, or assigns, the full and exclusive right of making, constructing, using, and vending to others to be used, his said invention, [improvement, art, machine, manufacture, or other composition of matter as the case may be,] agreeably to the Acts of Congress, in such case made and provided; your petitioner having paid thirty dollars into the Treasury of the United States, and complied with the other provisions of the said Acts.

[The name of the petitioner to be subscribed.]

The Description or Specification.

Before the petitioner can receive a Patent "he shall deliver a written description of his invention, and of his manner of using, or process of compounding the same, in such full, clear, and exact terms, as to distinguish the same from all other things before known; and to enable any person skilled in the art or science of which it is a branch, or with which it is most nearly connected, to make, compound, and use the same. And in the case of any machine, he shall fully explain the principle, and the several modes in which he has contemplated

the application of that principle, or character by which it may be distinguished from other inventions." [Act of 1793, sec. 3.]

The following form may be used for the preamble of the description or specification:

To all to whom these presents shall come: Be it known that I, ————, of ———— in the county of ———— and State of ————, have invented a new and useful ———— and that the following is a full and exact description thereof: [Here follows a description of the "art, machine, manufacture, or composition of matter."]

In drawing up the specification, particular attention must be paid to the requirements of the law. The following general directions upon this subject embrace those points which appear to be most important:—

If the specification does not contain the whole truth relative to the discovery, or if it contain more than is necessary to produce the desired effect, and if such concealment, or addition, shall fully appear to have been made for the purpose of deceiving the public, the Patent shall be void.

No more must be claimed in the specification than is the invention, or discovery, of the applicant. Many patents have been vacated in consequence of inattention to this last rule. In many cases it may be proper for the applicant to describe a whole machine in the specification, although parts of it may not have been invented or discovered by him, or may have been previously known; as it might otherwise be difficult to make known the improvements: but after doing this, he should distinctly set forth what he claims as not previously patented. This may be done best in a separate paragraph, at the end of the specification, as follows:

What I claim as my own invention, and not previously known, in the above described machine, is, &c., &c.

This is necessary to a compliance with the 3d section of the Act of 1793, which requires the inventor to distinguish his invention from all other things before known.

In regard to improvements, the 2d section of the act of 1793 provides that "any person who shall have discovered an improvement in the principle of any machine, or in the process of any composition of matter, which shall have been patented, and shall have obtained a Patent for such improvement, shall not be at liberty to make, use, or vend the original discovery;" and that "the first inventor shall not be at liberty to use the improvement;" and the same section declares, "that simply changing the form or proportions of any machine, or composition of matter, in any degree, shall not be deemed a discovery." The 3d section requires that the specification or description should be signed by the applicant, and attested by two witnesses, and that it should be filed in the office of the Secretary of State.

A defective description or specification may be amended, or it may be withdrawn, and another substituted by the applicant before the issuing of the Patent. If, after the issuing of a Patent, the inventor shall discover that his specification or description is imperfect, or that

he has in any particular omitted to comply with the terms and conditions of the 3d section of the act of February 21st, 1793, he may surrender such Patent and receive another, agreeably to the 3d section of the Act of July 2d, 1832, which provides that whenever a patent is invalid or inoperative, by reason that any of the terms or conditions prescribed in the 3d section of the said first mentioned Act," [that of February, 1793,] "have not, by accident, inadvertance, or mistake, and without any fraudulent or deceptive intention, been complied with on the part of the said inventor, it shall be lawful for the Secretary of State, upon the surrender to him of such Patent to cause, a new Patent to be granted to the said inventor, for the same invention, for the residue of the period then unexpired, for which the original Patent was granted, upon his compliance with the terms and conditions prescribed in the said 3d section of the said Act. And in case of his death, or any assignment by him made of the same Patent, the like right shall rest in his executors, administrators, assignee, or assignees."

Every inventor, if a *citizen* of the United States, before he can receive a Patent, must swear or affirm that he does verily believe that he is the true inventor or discoverer of the art, machine, or improvement, for which he solicits a Patent, which oath or affirmation may be made before any person authorized to administer oaths. This oath or affirmation may be in the following form:

County of ———, } ss.
State of ———, }

On this ——— *day of* ———, *in the year* 18—, *before the subscriber,* (insert the official designation of the person administering the oath) *personally appeared the within named* ————, *and made solemn oath* (or affirmation) *according to law, that he verily believes himself to be the true and original inventor of* (insert the title of the invention or improvement) *and that he is a citizen of the United States.*

If the applicant be an *alien,* but shall have resided for two years in the United States, the words "and that he is a citizen of the United States," must be omitted, and the following substituted:

"*And that the same hath not, to the best of his knowledge or belief, been known or used in this, or in any foreign country, and that he hath resided for two years in the United States.*"

If the applicant, being an alien, shall not have resided for two years in the United States, but shall have given notice of his intention to become a citizen thereof, instead of the words "that he hath resided for two years in the United States," must be substituted the following:

"*And that he hath given legal notice of his intention to become a citizen of the United States.*"

When application for a Patent is made by the legal representatives of a deceased inventor, the oath or affirmation is to be so varied as to be applicable to them. [Act of 1800, sec. 2.]

Of Drawings, Models, and Specimens of Ingredients.

The law requires that "the applicant for a Patent shall accompany" his application "with drawings, and written references, where

the nature of the case admits of drawings." [Act of 1793, sec. 3.] These drawings should be according to the rules of perspective, and neatly executed; and such parts as cannot be shown in perspective, should, if important, be represented in section or detail. When the specification refers to the drawings, duplicates of them are required. Drawings are necessary even though a model be sent.

Where the application is for a Patent for a machine, the law requires that "the inventor shall moreover deliver a model of his machine, provided the Secretary shall deem such model to be necessary." [Act of 1793, sec. 3.] By a regulation prescribed by the Secretary of State, some years ago, and still continued, a model is required in all cases. The model should be neatly made, and as small as a distinct representation of the machine, and its intended properties will admit; and the name of the inventor should be printed upon, or affixed to it, in a durable manner.

Where the invention is of "a composition of matter," the law requires that the application be accompanied "with specimens of the ingredients, and of the composition of matter, sufficient in quantity for the purpose of experiment."

Of Interfering Applications.

"In case of interfering applications, the same shall be submitted to the arbitration of three persons, one of whom shall be chosen by each of the applicants, and the third person shall be appointed by the Secretary of State; and the decision or award of such arbitrators delivered to the Secretary of State, in writing, and subscribed by them, or any two of them, shall be final as far as respects the granting of the Patent. And if either of the applicants shall refuse or fail to choose an arbitrator, the Patent shall issue to the opposite party.—And where there shall be more than two interfering applications, and the parties applying shall not all unite in appointing three arbitrators, it shall be in the power of the Secretary of State to appoint three arbitrators for the purpose. [Act of 1793, sec. 9.]

Before an application can be referred, the applicant must have done all which the law requires him to do previously to the issuing of a Patent.

Fees payable in the Patent Office.

"Every inventor, before he presents his petition to the Secretary of State, signifying his desire of obtaining a Patent, shall pay into the Treasury, thirty dollars; and the money thus paid shall be in full for the sundry services to be performed in the office of the Secretary of State. [Act of 1793, sec. 11.]

This requirement of the law will be complied with, by a payment made to the Treasurer of the United States, at Washington, or to his credit in any one of the selected deposite Banks. In either case, duplicate receipts must be taken, stating by whom the payment is made, and for what object, one of which receipts must accompany the petition.

The practice which has heretofore existed in some cases, of sending

the money to the Secretary of State, or the Superintendent, is not in conformity with the law, and is to be discontinued.

"For every copy which may be required, of any paper respecting any Patent that has been granted, the person obtaining such copy shall pay at the rate of twenty cents for every copy sheet of one hundred words, and for every copy of a drawing, the party obtaining the same shall pay two dollars." [Act of 1793, sec. 11.]

For authenticating a copy of any paper under the seal of the Department, a fee of twenty-five cents is required by law to be paid. The recording of transfers is charged at the same rate with the copying of Patents.

The fees for copies of Patents, and of papers or drawings relating to them, and for recording transfers, must be paid at the time the copying or recording is ordered.

Of the Renewal of Patents.

The 2d section of the Act of July 3d, 1832, provides "that application to Congress, to prolong, or renew, the term of a Patent, shall be made before its expiration, and shall be notified at least once a month for three months, before its presentation, in two newspapers printed in the City of Washington, and in one of the newspapers in which the laws of the United States shall be published, in the State or Territory in which the patentee shall reside. The petition shall set forth, particularly, the grounds of the application. It shall be verified by oath; the evidence in its support may be taken before any judge or justice of the peace; it shall be accompanied by a statement of the ascertained value of the discovery, invention, or improvement, and of the receipts and expenditures of the patentee, so as to exhibit the profit or loss arising therefrom."

Caveats are not recognised by the Patent laws of the United States. But papers containing descriptions of discoveries or inventions, claimed as new, may be filed in the office at any time before an application for a Patent is made. They will be so far useful as to show subsequent applicants whether they have been anticipated in their inventions. These papers, when filed, are open to the inspection of the public, in the same manner as those relating to Patents.

Patents are issued in the order of time in which the proper documents are received at the Patent Office; but this rule applies only to cases in which the documents are complete.

Communications to and from the Superintendent of the Patent Office, are free of postage; and the petition to the Secretary of State, with the accompanying papers, may be transmitted directly to the Superintendent.

JOHN FORSYTH,
Secretary of State.

Notice to Persons Having Business with the Patent Office.

The Patent Law directs that "every inventor, before he presents his petition to the Secretary of State, signifying his desire of obtain-

ing a patent, shall pay into the Treasury thirty dollars; and shall take duplicate receipts, one of which receipts he shall deliver to the Secretary of State when he presents his petition."

It has been the practice, in many cases, to send the money above mentioned to the Secretary of State, or to the Superintendent of the Patent Office; but, in future, all applicants for patents, will conform to the directions of the law on the subject, and make the required payments into the Treasury.

It will be a compliance with the law, in this respect, to pay the money to the Treasurer of the United States at Washington, or to his credit in any one of the selected Deposite Banks. The receipts should state by whom the payment is made, and for what object.

It has also been the practice to transmit to the Patent Office papers describing new inventions and improvements, which the inventors have not yet completed, or for which they are not prepared to take out patents; and it has been erroneously supposed by those inventors, that by filing such papers in the office, they would prevent any other persons from obtaining patents for the like inventions or improvements. Sometimes the persons sending such papers have claimed to have them received as their private property, and as not liable to be seen by any one, except with their consent.

Caveats not being recognized by the patent laws of the United States, no papers will hereupon be received under such a claim; and those which have been heretofore deposited, if permitted to remain, will be open to public inspection. Persons, therefore, who have transmitted to the Patent Office, papers relating to inventions or improvements, unaccompanied by applications for patents for the same, which papers they claim as their private property, and as not subject to be seen by others, are requested to withdraw them.

JOHN FORSYTH,
Secretary of State.

Department of State, Oct. 3, 1834.

Notice respecting the foregoing Information to Persons applying for Patents.—By the Editor.

In the number of this Journal for November, 1828, vol 2, new series, p. 332, we published the circular of the Patent Office, giving "Information to persons applying for Patents, or transacting other business at the Patent Office. The information then given has been re-modeled by the Secretary of State, as will be seen in the preceding articles. This had become necessary in consequence of the passage of certain laws upon the subject, since that circular was issued, and also in consequence of some alteration directed to be made in the manner of transacting the business of the office, particularly as respects the payment of the Patent fee, and the disposition of papers lodged in the office by inventors previously to their being prepared to obtain patents, and usually denominated Caveats. Such papers were formerly kept private upon a request being made to that effect; they are henceforth, if placed on file, to be open to the inspection of those who wish to examine them, and will, therefore, be considered in the

nature of public notices that the thing described has been invented by the individual named in them

The change which has been made in the manner of paying the Patent fee, in order to make it conform with the legal provisions upon this subject, will be attended with considerable inconvenience to persons residing at a distance from any Deposite Bank. Several persons have, in consequence, transmitted the money to the Editor, for the purpose of having it paid into the Treasury of the United States; and he will very cheerfully transact this business for any of his correspondents, provided their letters come free of postage, and the money is such as will be taken in the Bank of the Metropolis, in Washington. As no fee will be charged for this, the whole transaction must be at the risk of the person remitting the money; the offer is made for the accommodation of those in whose pursuits the editor feels an interest, and is therefore willing, at the expense of a little trouble to himself, to relieve them from the difficulty above noticed, his residence in Washington, connexion with, and proximity to, the public offices, enabling him to do so.

FRANKLIN INSTITUTE.

Quarterly Meeting.

The forty-third quarterly meeting of the Institute, was held at their Hall, October 17, 1834.

Thomas Fletcher, Vice President, in the Chair.

Mr. Samuel Hufty was appointed Recording Secretary, P. T.

The minutes of the last meeting were read and approved.

Donations of books were received from Henry Beaufoy, Esq., F. R. S., and Professor Faraday, of London—and from Messrs. Thos. Latimer, George Fox, Victor Value, B. H. Coates, M. D., and S. C. Walker.

Donations of minerals, from Messrs. John C. Trautwine, and Thos. Pearson.

Donations of models, from Mr. David J. Burr, of Richmond, Va., and Mr. Wm. C. Hughes, of Columbia, Penn.

The actuary laid on the table the various periodicals which had been received during the last three months, in exchange for the Journal of the Institute.

The chairman of the Board of Managers read the forty-third quarterly report, which was accepted, and referred to the Committee on Publications.

The Treasurer made his report of the funds of the Institute for the quarter ending Sept. 30th, which was accepted.

The Committee on Statistics made their report, which was accepted, and the committee discharged.

Extract from the minutes.

Thomas Fletcher, *Vice President.*

Samuel Hufty, *Rec. Sec. P. T.*

Forty-third Quarterly Report of the Board of Managers.

The Board of Managers respectfully offer their forty-third quarterly report:

The affairs of the institution continue in the same flourishing condition as stated in our former reports.

The Committee on Instruction are making every exertion to render the lectures and schools of the Institute worthy of the most liberal patronage. In addition to regular courses on Chemistry and Natural Philosophy, which will be rendered more than usually attractive, by the introduction of new and interesting subjects, arrangements will be made to occupy the evenings devoted to volunteer lectures, with matter that shall reflect credit on the Institute, and promote the cause of sound knowledge. The Drawing School will be placed under the joint superintendence of Messrs. William Mason and John M'Clure. Mr. Mason, who has been long and advantageously known to this community as one of the best instructors in drawing, needs not our praise; but it may be proper to state that we feel sensible that, in procuring the services of Mr. M'Clure, for the instruction of pupils in what may properly be called the practical part of architectural drawing, we have made an acquisition to the department of instruction, of no ordinary character. The Drawing School is now established on principles that render it at least equal to the best in this city, and the Board earnestly recommend it for the most liberal support.

The evening English school will be opened under the care of Mr. Seth Smith, whose faithful and zealous services in his department merit our warmest praise, and will, we hope, insure him more liberal encouragement than has heretofore been given. The Board have no hesitation in recommending this school as inferior to none in this city, for the instruction of apprentices in all the branches of a good English education, and, on a fair comparison with others, believe that it will be found the cheapest. The lectures will commence on Monday, the 27th day of October, and the schools as announced in the daily papers.

Since the last report, the Committee on Science and the Arts have held three stated meetings, and one special meeting. Besides the regular business, consisting in the examination of inventions by sub-committees, and the examination of their reports by the general committee, the committee have had before them a plan for a combined series of meteorological observations, to be made in different parts of our country. A sub-committee having met, and conferred with a similar committee on the part of the American Philosophical Society, an arrangement has been made, by which the influence of both associations will be directed towards the inquiries in view. To test the practicability of an extended plan of observations, the joint committee referred to have drawn up a circular, proposing certain points for examination and report by observers, and which, while they are both interesting and important, require but little aid from instruments. A copy of the circular is herewith submitted.

The monthly meetings, which were discontinued during the months of July and August, have been resumed. The meeting in September was a very interesting one, and was well attended.

The Reading Room and Library continues to attract the attention of members. Some valuable books have been added during the past quarter.

It is painful though necessary to refer to a subject in connexion with this department of the Institute, which was referred to the managers at the last quarterly meeting—namely, the practice of mutilating newspapers, pamphlets, and books. After a full investigation of this matter, the Board passed the following resolution:

Resolved, That any member detected in mutilating the newspapers, pamphlets, or books, belonging to the Institute, shall be deprived of his right of membership, and that the name of the offender shall be made public.

No cause of complaint having occurred since the period referred to, the Board hope that they will not again be called upon to notice the recurrence of a practice so disreputable to any member of the Institute.

During the past quarter, Mr. Wm. Hood, and Mr. David Hoopes, have been admitted life members of the Institute.

(Signed.) ALEXANDER FERGUSON,
Chairman.

WILLIAM HAMILTON, *Actuary.*

Circular in relation to Meteorological Observations, by the Joint Committee of the American Philosophical Society, and of the Franklin Institute.

The following circular having been issued by the Joint Committee on Meteorology, of the American Philosophical Society, and of the Franklin Institute, we take this opportunity to lay it before our readers, and to invite their attention to its contents.

COM. PUB.

PHILADELPHIA, Oct. 29, 1834.

SIR,—At a joint meeting of two committees appointed, one by the American Philosophical Society, and one by the Committee of Science and the Arts of the Franklin Institute of the State of Pennsylvania, to confer together on the best means of promoting the advancement of Meteorology, held at the Hall of the Franklin Institute, on the evening of the 9th inst., it was resolved that a sub-committee be appointed to furnish a project for certain simple observations, which may tend to elucidate important points in meteorology, and which may be at once entered upon, by observers in different parts of our country, and also to present a form of circular, to be forwarded to persons who may be considered competent to carry into effect the above objects.

In conformity with this resolution, and as a preliminary to the introduction of a more extended plan, which the joint committees are now maturing, the following circular has been prepared, and is for-

warded to you by the committee. The prime object of this circular is to obtain a complete knowledge of all the phenomena accompanying one or more storms of rain or hail, not only where the violence of the storm is felt, but at and beyond its borders, its beginning and its end.

For this purpose, you are requested, immediately on receiving this circular, to commence a journal of the weather, noting the direction of the wind at the surface of the earth, and in elevated strata, as indicated by the clouds, which may frequently be seen at different elevations, moving in different directions; the upper current of all being, at Philadelphia, generally from some western point. Let the strength and direction of the wind, and the appearance of the heavens as to clear or cloudy, and the character of the clouds, according to your own mode of description, be noted at least three times a day, as near the following hours as convenient—7 A. M., 2 P. M., and sunset. Let the heavens, however, be examined very often, so that any sudden change may not pass unobserved, especially in the direction of the wind; and when any occurs, let it be noted, with its time, under the general head of "observations."

The plan which we recommend in observing slow moving clouds, is to keep the head steady in one place, with the top of a chimney, or some distant fixed object, between the eye and any remarkable point of the cloud, until this point shall have moved so far from behind the object, as to leave no doubt of its direction.

As to upper and lower strata, when one passes under the other, there is an optical deception to be guarded against when the upper one moves with the greatest angular velocity. This deception may generally be avoided by noticing which cloud is obscured by the other as they pass. Sometimes, also, an upper current of air may be detected when there is but one stratum of clouds, if these are of the columnar, snowy-topped kind, which are frequently seen in a hot summer day; as these clouds are frequently formed between two currents, their tops will lean in the direction of the upper current, and, indeed, sometimes be blown off and dissipated, in a direction different from the air below.

We also particularly request, that if you hear of any storms occurring in your neighbourhood, you will collect all the information concerning them in your power.

Particularly inquire the course of the wind at the commencement of the storm, and at its termination; the width of the storm; its direction; its velocity; the direction of the wind at its sides; how the wind veers round—whether in different directions at its sides, or not; whether, in case of hail, there are two veins, or only one; where there is the greatest fall of rain, near the borders, or near the centre of the storm—and whether this fall takes place near the beginning, middle, or end of the storm; whether the clouds are seen moving with the wind, or against it, and whether differently among themselves; and every thing else which you think may tend to an explanation of this most interesting phenomenon.

Let the time of beginning and end of all rains be particularly noted, any change in the strength and direction of the wind during their progress, and the quantity, as near as possible. Mark the time of meteors, or shooting stars, and auroras, and, if possible, the stars through which they pass. These observations, if made by very many correspondents throughout the United States, will elucidate the main object which the committee has in view in the present circular, and it is hoped, greatly assist in giving interest and value to the plan in contemplation. But, as many observers may be willing to do more, we will remark that the observations on storms will be much enhanced in value, if accompanied by observations on the "Dew point;" for it may be, that hurricanes never occur only when the dew point is high.

A very simple as well as accurate method of taking the "Dew point" is, to use a thin tumbler of tin, kept very bright and clean on the outside—and, in the summer, cold water, and in the winter, snow or ice, and, if necessary, salt, mingled with water; and when these are not at hand, a mixture of muriate of ammonia, and nitrate of potash, in equal quantities, pounded very fine, put into the tumbler with water. By any of these means, a temperature may soon be obtained below the "Dew point." When dew settles on the tumbler, it must be carefully wiped off, very dry, and the fluid within stirred with a thermometer, and this must be repeated until the fluid is gradually heated up by the air, so that the moisture ceases to settle; the highest temperature at which it will settle, is the "Dew point."

For observations of the dew point to be of any value, however, they must be made constantly, every day, at least once a day.

Again, some may be unwilling to take the dew point, who would be glad to know that it may be obtained, approximately, by the following indirect method:

Take two thermometers that agree, or allow for the difference; cover one of them with a wet white rag, and swing them simultaneously in the air, (for it will not do to let them be at rest, unless the wind is blowing fresh;) when it is discovered that they cease to change by swinging, take 103 times their difference, and divide it by the wet-bulb temperature, and subtract the quotient from the temperature of the naked-bulb—the remainder will be the dew point. This formula is founded on experiments from 20° Fahr. to 80°, and does not differ, at either extreme, from the most careful experiments. We cannot refrain from saying, we are sure that every lover of the science will be richly rewarded for all the pains he may bestow on the dew point, even independent of the results which will undoubtedly be derived from a comparison of these simultaneous observations.

In conclusion, the committee request that, should your occupations prevent you from attending to the subject yourself, you will find in your vicinity a competent observer to take your place.

Please to forward your observations, monthly, to the *Joint Committee of the American Philosophical Society and Franklin Institute, care*

of William Hamilton, Actuary of Franklin Institute, Philadelphia, by mail, when a private conveyance is not at hand.

JAMES P. ESPY, *Chairman Joint Committee.*

GOUVERNEUR EMERSON, M. D.
C. N. BANCKER,
ALEXANDER D. BACHE,
} *Com. of Amer. Philos. Soc.*

JAMES P. ESPY,
ALEX. D. BACHE,
H. D. ROGERS,
S. C. WALKER,
P. B. GODDARD, M. D.
} *Committee of Franklin Institute.*

Monthly Conversation Meeting.

The first conversation meeting of the Institute, for the season, was held at their Hall, Sept. 25th, 1834.

Mr. L. Norcross, of Dixfield, Maine, exhibited his diving apparatus, with which he had made an experiment in presence of a committee of the Institute, at the Navy Yard. The apparatus consists of a water proof dress, of gum elastic cloth, and a metallic head-piece, with appropriate tubes for the admission of fresh air, and the escape of that vitiated by respiration. The air is forced in by a pump. A glass window in front of the head piece, enables the operator to examine any object, and his hands are at entire liberty.

Mr. Haydock, of Philadelphia, submitted to the examination of the members, a copper vessel, which had been used as a cistern, and connected with the city water works, and which, during that connexion, had collapsed. The explanation of this phenomenon is understood to have been given by Prof. Hare, to the Philosophical Society of this city.

A mortising machine, by Mr. John H. Chandler, of Worcester, Mass., was put in operation, and attracted much attention.

Prof. W. R. Johnson exhibited apparatus for determining the latent heat of melting iron, and the specific heat of the same metal in a state of fusion, which had been employed in connexion with his steam pyrometer, in recent experiments on those subjects.

Committee on Science and the Arts.

The Committee on Science and the Arts, constituted by the Franklin Institute of the State of Pennsylvania for the promotion of the Mechanic Arts, to whom was referred for examination a Plan for preventing accidents from the breaking of the axles of Rail-Road Cars and Locomotives, invented by Mr. Joseph S. Kite, of Philadelphia, REPORT:—

It is well known that the fracture of such axles almost invariably takes place near the nave, or hub, of the wheel, and the desideratum in such a case, is to preserve the two pieces of axle from *falling to the ground*, and, consequently, overturning the car. This, Mr. Kite

proposes to effect, by introducing in each car, two longitudinal pieces of timber, (which he calls *safety beams,*) inside of the wheels, and parallel to the usual string pieces, which support the boxes or chairs of the axles. To these inside beams, are attached an additional set of chairs, which, in order to avoid unnecessary friction, are so arranged as not to come into contact with the axle, except when the latter breaks.

When this happens, they arrest the descent of the pieces, and thus not only retain the car in an upright position, but may even permit it, in some cases, to proceed as before. These chairs are so constructed with double bearings, as to allow play to two axles of different diameters, the *smaller* bearing being for the axle *proper*, and the *larger* one for the *nave of the wheel;* which, if the break takes place immediately at the union of the hub and axle, becomes itself a *temporary* axle, upon which its attached wheel revolves, independently of the axle *proper*—the latter, with *its* wheel, being supported by the *smaller* bearing of the double chair. The wheels are prevented from separating transversely, by means of proper keepers outside of the chairs.

The committee consider Mr. Kite's arrangement both effective and simple, and consequently recommend it as deserving of practical test.

By order of the committee.

WILLIAM HAMILTON, *Actuary.*

June 12th, 1834.

The Committee on Science and the Arts, constituted by the Franklin Institute of the State of Pennsylvania for the promotion of the Mechanic Arts, to whom was referred for examination a Spirit Level, invented by Mr. Henry R. Campbell, of Philadelphia, REPORT:—

Considerable difficulty has hitherto been experienced in rail-road field operations, from the want of an instrument which might combine the common spirit level with a correct circle for laying off angles, with sufficient accuracy for the tracing of curves, and which, at the same time, would admit of pitching, or inclining, the telescope, without the necessity of throwing the parallel plates out of adjustment. In the tracing of curves, the union of these qualities is particularly desirable, the operation having hitherto generally required two separate instruments, viz: the common compass, and the spirit level. The former, besides never being divided with that degree of minuteness which is necessary for a proper execution of the work, allows, through its upright slits, a field of view entirely too large to define the points of curve in a satisfactory manner. Mr. Campbell's improved level obviates these disadvantages in a perfect manner. His improvement consists in the *combination* of the common level, with a circle divided into minutes; a screw is attached to one of the Y's, as in the old English levels, by which the telescope may be so inclined as to obtain points of curve on a sloping surface, without throwing the di-

vided circle out of a horizontal position; a compass is so applied, as to be attached and detached at pleasure.

Mr. Campbell's object in requesting a notice of his level, is merely to prevent any other, to whom the same combination may suggest itself, from patenting the same, and thereby retarding its introduction into common use.

By order of the Committee.

WILLIAM HAMILTON, *Actuary.*

Aug. 14*th*, 1834.

The Committee on Science and the Arts, constituted by the Franklin Institute of the State of Pennsylvania for the promotion of the Mechanic Arts, to whom was referred for examination, Goodspeed & Wiswell's patent "Circular, Vertical, and Angular Sawing and Boring Machine," REPORT:—

That the machine under consideration is a species of saw mill, in which, instead of placing the saw or saws upon cross heads, between two bars or rods acting as stretchers, there is a single support for the cross heads in the middle of the movable frame, and the saws are placed near the extremities of the cross heads, by which arrangement, the saws are left free to operate on planks or boards of any required length or breadth; the central or main support of the saws is sustained by flanges in its upright position, and other convenient flanches receive the cross heads above mentioned.

To use the saws above described for cutting circular segments out of plank, either at right angles to its face, as in the case of the rims of carriage wheels, or at any obliquity, as in that of chair backs, the inventors have employed a quadrant, capable of being adjusted to any required radius, and of lying either horizontal or inclined, according as the rectangular or the oblique section is to be made in the plank. This quadrant is, by means of several separate centres, capable of producing circles of a great variety of radii.

By means of a graduated index and a circular saw, another part of the machine is made to perform the operation of angular sawing, so as to cut from the ends of the felloes of carriage wheels, the requisite sections, in order that they may precisely complete a circle, when the required number is brought into the due position. This graduated index, like the quadrant before mentioned, is adapted to different radii, and to different numbers of felloes to a wheel. The hubs of wheels are bored by another part of the same machine, in which there is a sliding support for the hub, which, for this purpose, is made to rest on an arbor supported by journals, and is then sent forward to be presented to the auger, moving always through the same distance for the same hub, and, of course, boring every hole of the same depth. The auger is placed in supports, which rise and fall at pleasure, in order to "enable the operator to bore at any distance from the table or plane he chooses."

The inventors particularly claim the application of the method of hanging the vertical saws, and the mode of raising and depressing the augers.

The committee have witnessed the performance of a machine of the usual size, and of the above description, and can testify to the celerity and precision with which the constituent parts of a wheel rim are taken from the plank, the ends cut off, the holes bored for the tenons, and the whole thus made ready for being driven upon the spokes. An advantage of no small moment results from the use of this machine, in the saving of material—it being customary, in many establishments, to cut up into chips all those parts of the plank, which the curved form of the felloes does not allow the axe and adze to separate in a more convenient or useful shape.

The committee cannot doubt that wheelwrights, chair makers, and others, who have occasion for the operations of circular or angular sawing, would find this machine an important auxiliary in their respective trades.

By order of the committee.

WILLIAM HAMILTON, *Actuary.*

Aug. 14th, 1834.

AMERICAN PATENTS.

LIST OF AMERICAN PATENTS WHICH ISSUED IN MAY, 1834.

With Remarks and Exemplifications, by the Editor.

1. For *Softening Sheep Skins, and removing the Fleece;* Jonathan Mann, Amesbury, Essex county, Massachusetts, May 1.

Any required quantity of water is to be heated blood warm, and potash, to the amount of six pounds for every hundred skins, is to be dissolved in it. The skins, if dried, are to be soaked in this liquor for three or four days, a shorter period sufficing if they are green. When taken from the liquor, and well washed, they are ready for pulling.

The old process, it is said, consisted in soaking the skins in water for from three to six days; then beaming, working, and scraping them; soaking them again for three or four days, then beaming, draining, and working; covering the flesh side with paste of slacked lime, packing and piling them together, for two or three days, and then washing, draining, and pulling them.

At p. 339, there is an account of a patent for removing fur from skins, in which process, potash is employed. We have turned to one account only of the processes previously followed, and that is under the article MAROQUIN, in the *Dictionnaire Technologique*, where, speaking of the objections to the use of lime, it is observed that, to lessen them, "many manufacturers diminish its quantity, and substitute for it wood ashes, or common potash."

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2. For a *Clamp for Sewing and Stitching Harness;* Joseph Burrington, Burke, Caledonia county, Vermont, May 1.

(See specification.)

3. For *Fire Places for Cooking, and Warming Buildings;* James Cox, city of Philadelphia, May 2.
(See specification.)

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4. For a *Canal Steamboat;* Daniel W. Croker, city of Philadelphia, May 3.

In order to confine the boat within a proper width, and to prevent the washing of the banks, the paddle wheels are to be placed one on each side of the stern port, in the after part of the boat, recesses being left for that purpose; this, it is said, will accomplish the first named object. The second is to be attained by giving the buckets of each wheel such an inclination as will cause the water to flow inwards, towards the keel of the boat.

The points claimed, are the making recesses for the wheels near to the stern of the boat, thus saving much room; and placing the paddles, or buckets, at such an angle as to throw the waves inside, thus preventing injury to the sides of the canal.

The situation chosen for the paddle wheels, we think one of the worst in the whole boat, and we apprehend that the employment of oblique paddles, for throwing the water inward towards the keel, will produce little advantage; but little difference will be thereby produced in the swell, that being caused by the displacing of water by the boat, and its flowing in behind as it advances. If a boat is drawn by horses, the swell still takes place; and as regards the agitation produced by paddles, we think the twin boats, so frequently used, with a paddle wheel between them, much better calculated to produce this effect; it will not, however, promote the object of making the boat narrow.

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5. For a *Machine intended to put into operation a New Principle in Hydraulics;* Thomas Hutchings, Reading, Berks county, Pennsylvania, May 7.

Albeit we have paid some attention to hydraulics, and have read with much attention the description of this new machine, intended to operate upon a new principle, we have been altogether unable to keep pace with the patentee in his developments. This is the more to our discredit, as the drawing which accompanies the specification is sufficiently well executed to make its intention known to any one capable of comprehending it; and it also has the requisite references to its different parts. The machine, it is true, very much resembles some of those which are intended to move forever, and to set at nought the inertia of matter, and the effects of friction; and, perhaps, our present obtuseness of perception may result from the entire incapacity, under which we have always laboured, of perceiving how any one of this whole class was to operate.

We are not quite sure that we shall be able to give a clear general idea of the manner in which this machine is intended to be constructed; and as to its mode of operation, we have already said

enough to forbid any expectation of our attempting an explanation of that.

The power of the machine is to be derived from balls of wood, or of some other substance which will float in water. At the lower part of it, there is to be a receiver, or vessel, which is to be kept filled with water. This vessel is represented as a vertical cylinder, from the centre of which rises a tube, or conductor, also filled with water, and through which the balls of wood are to rise to such a height as to be delivered into buckets on the vertex of a vertical power wheel. Within the receiver, or vessel, below the conductor, there are placed two cylindrical rollers, which revolve with their peripheries in contact, being carried by a band on the axis of one of them, which passes through the receiver. These cylinders are to be stuffed with some yielding material, that they may press together, so as to prevent the water passing between them, whilst, by their yielding, they are to allow the balls of wood to pass. The vertical wheel, of which we have spoken, is surrounded by buckets, or pockets, into which the wooden balls are to fall; in the drawing, these buckets are sixteen in number. Now, if the eight buckets on one side have balls in them, the wheel will tend to descend by their weight; each ball is, in turn, to fall out as it arrives at the bottom, and to run through a tube into the receiver, where, passing between the elastic revolving cylinders, into which it is to imbed itself, it rises by its levity through the tube, denominated a conductor, and is delivered, by a spout, on to the vertex of the wheel. There are contrivances to supply the water lost by evaporation, or by leakage; and the main wheel, by the weight of the wooden balls, is to give motion to the collateral parts of the machinery, and to perform whatever labour may be assigned to it.

We are inclined to recommend to the inventor of this machine, in order to insure its operation, the appending to it of some one of the many patented "horse powers," as, without an addition of this kind, it will assuredly remain at a stand still.

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6. For an *Apparatus for the relief of Procidentia, Prolapsus Uteri, &c.;* Amos G. Hull, M. D., city of New York, May 7.

The Doctor states that he has discovered a new fact in surgery, namely, that a prolapsus of the womb, or other organ of the pelvis, can be relieved, or cured, by pressure made upon the belly. The instrument used by him, is in the general form of a truss for hernia, but the front pad is made much larger, and so as to press centrically upon the region to which it is applied. The description given is very full and distinct, and the instrument is well represented in the drawing. The claim made is to the apparatus, founded upon "the discovery of the fact, that properly directed pressure made upon, or against, the lower part of the belly, relieves, and often effectually removes, the falling of the womb, and many other maladies frequently connected therewith."

None but medical men are aware of the amount of suffering which

would be prevented, should the facts be as stated by Dr. Hull; and, in that case every friend of humanity would rejoice to learn that his remuneration was commensurate with the benefits conferred.

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7. For *Preventing Explosions in Steam Boilers;* Cadwallader Evans, Engineer, city of Philadelphia, May 8.

This patent is taken for "an improvement in the mode of applying the fusible alloy as a guard against explosions of steam engine, and other boilers."

Those acquainted with the various devices which have been proposed, and adopted, for the prevention of explosions, know that a fusible alloy, which shall melt by the temperature of the water, or steam, before it rises so high as to be dangerous, has been applied in various ways, and that in France its employment is legally enforced. As hitherto employed, it is liable to several objections, among which is the alteration which the alloy itself undergoes, by fusion in contact with atmospheric air; becoming thereby, to a certain extent, oxidized, and, consequently, having its fusing point changed. Another objection has arisen from the fusion of these disks giving a vent to the steam, through an aperture which could not be closed until the contents of the boiler had become cooled; a circumstance not only attended with delay, but sometimes pregnant with real danger, as the boat, deprived of the action of the engine, may be actually driven on shore. Both these sources of danger are guarded against by the invention of Mr. Evans, in a way which promises to be perfectly effectual, and some idea of which may be collected from the following claim:

"I have thus described two modes in which I intend to carry my improvement in the mode of applying a fusible alloy into effect, which improvement, I do hereby declare, consists in the employment of an air tight tube, or vessel, to contain the alloy, by which it will be preserved from oxidation, or water, for a great length of time, and in which it can be used many times in succession for indicating a certain elevation of temperature, without the necessity of renewing it; avoiding thereby the inconvenience and danger incident to the modes heretofore practised in the employment of it. I therefore claim the using of such alloy in the manner, or upon the principle, herein set forth, whether the same be effected by means of an instrument constructed exactly in the form described, or in any other in which a similar effect is produced by analogous means."

The alloy, when in the solid state, sustains a weighted arm, by enclosing, and holding, a piece of metal attached to the end of a journal, which passes through the box; but when the metal fuses, the weighted arm, which is on the outside of the box, descends, and, in doing so, gives notice, by opening a valve for the escape of steam.

The different modifications of this contrivance cannot be fully understood without reference to the drawings, which are perfectly descriptive.

8. For an improvement in the *Grist or Flouring Mill;* Isaac Straub, Northumberland county, Pennsylvania, May 9.

A hammer, or knocker, is to be so fastened by a joint at one of its ends, to a mill spindle, or other moving part of a grist mill, that whenever the speed of the moving part is increased, the loose end of the hammer, or knocker, will rise, by its increased centrifugal force, and stand at such height as shall be proportioned to its velocity. At a certain point within the range of its rise, a permanent latch, or trigger, is to be fixed, which will be struck, and let off, by the revolutions of the hammer, or knocker. This trigger, or latch, is to be properly connected, by means of levers, or otherwise, to the water gate; "a description of which cannot be given, as mills are so very dissimilar in themselves, that this connexion must necessarily vary, to suit other things, in different mills." The claim is to "the hammer, or knocker, or bolts, or shafts, fixed in any manner to the movements of a grist or flouring mill, calculated to take effect from increase of rotary speed, or motion."

A description like the foregoing, if description it can be called, does not by any means fulfil the requirements of the patent law. The patentee may have a very clear idea of the means of carrying his contrivance into effect, but his business is to convey this idea clearly to others. From the variety of mills he ought to have selected one, at least, and have fully exemplified in this, his mode of procedure; instead of which, his patent seems to be taken for an abstract principle, in which case it cannot be sustained in law. The drawing would lend little, or no, aid to the workman, in his attempt to carry the principle into practical operation.

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9. For a machine for *Kneading Dough for Making Bread;* Noah Wyeth, Hingham, Plymouth county, New Hampshire, May 12.

The dough is to be placed upon a movable platform, which is made to traverse backward and forward by means of a double rack and pinions operating beneath it. A stamper working upon a pin at one end, and being raised and depressed at the other by the action of a toggle joint, works up and down upon the dough as it passes under it. The power applied to produce the necessary motion, whether that of a horse, or any other, is communicated to the toggle joint by means of a pitman, or shackle bar, acting horizontally, and receiving its traversing motion from a crank on a vertical shaft. A rod from the rising end of the stamper serves to convey the necessary movement to the platform, in a way which need not be described. The claim is to "the application of the toggle joint to the stamper, and to the combination of machinery for moving the platform."

This we believe is as much as could be fairly claimed, and it amounts to little or nothing, as the same kind of movement may be equally well obtained by combinations very different from those described in the patent, and not in the slightest degree interfering with them.

10. For a *Corn Sheller and Grinder;* Samuel Slater, and Stephens Noblet, city of Philadelphia, May 12.

The two parts of which this machine consists are, confessedly, both old, the claim being made to the using the axis of the vertical cast iron plate, which forms the sheller, as a machine for breaking or grinding the corn; giving to it, for this purpose, the shape of a grooved, or other cylinder, with an adjustable concave. The machine can thus be used, alternately, for either purpose. It is expressly said, that "the part claimed as an invention, or discovery, is the union of the sheller and grinder in one machine." The amount of invention in this case is certainly very small, and we are apprehensive, too, that it is not of that kind which the law will recognise. If I take a horse power invented by one man, and a thrashing machine invented by another, and merely gear them together, it is much to be doubted whether, in the eye of the law, I should be viewed as an inventor.

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11. For *Machinery for pumping, raising, and conveying Water, and for propelling all other kinds of Machinery whatever;* David G. Colburn, Cayuga county, New York, May 12.

The title of this patent excited some apprehension that the hydraulic apparatus, the construction of which it is intended to secure, was such as the inventor might very safely use, without the fear of competition, although he had not obtained the sanction of an exclusive right; and an examination of the description and drawing has more than confirmed this impression; for, although this patent is not taken for a perpetual motion, it is obtained for a thing which will demand twice as much power to wind it up, as it will ever give back again. A more direct misapplication of mechanical principles has, in fact, been very rarely devised.

There is to be a cylinder fixed upon a horizontal shaft, around which cylinder is to be wound a rope, or chain, with a weight hanging thereto, serving, by its descent, for the power which is to work the pump, and raise the water. At one end of this cylinder there is a ratchet wheel, to hold it as it is wound up; and attached to the same shaft is a cog wheel, which may be six feet in diameter. This cog wheel is to drive a pinion of six inches in diameter, fixed upon another horizontal shaft, upon which also is a wheel of four feet in diameter, the periphery of which is to be scalloped, or waved, for the purpose of giving motion to the pump handle. The pump handle is a lever, or beam, working on a pin at its centre, like a scale beam; and a fork descending from the middle of this beam, embraces the scallop edge of the before-named wheel, which, if it turns round, will cause the beam to vibrate as many times as there are scallops, or waves, on the wheel. To one end of this lever beam the pump rod is attached, and the other is to be notched like the arm of a steelyard, and to have a weight hung upon it to *weigh the quantity of water to be raised;* "this being a very essential part of the operation." The depth to which the weight must descend, in order to keep this apparatus at work for twenty-four hours, may, we are told, be about fifteen feet.

"My claim is for the adapting this combination of machinery to the uses above specified, viz: pumping, raising, and conveying water, and for propelling all other kinds of machinery whatever."

We assure the reader that we are not a somnambulist, but are actually wide awake, and have given the views and intentions of the patentee as fully, clearly, and exactly, as it is in our power to do in the same number of words.

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12. For a *Machine for Shearing Woollen Cloth;* Reuben Daniel, Woodstock, Windsor county, Vermont, May 13.

The specification of this machine commences by stating the things claimed by the patentee, which are the following:

"First. I claim as my invention, the method of constructing the ledger blade, and the revolving cylinder, or bar, to which the twisted cutting blades are attached, of such a proper degree of stiffness as to permit of their being ground together with emery, or other hard pulverized substance, and oil.

"Secondly. I claim as my invention, the method of grinding the ledger blade, and the revolving cylinder containing the twisted cutting blades, by the use of emery, or other hard pulverized substance, and oil, as applied to the revolving cylinder in rapid motion.

"Thirdly. I claim as my invention, the method of making the hollow cylinder to receive the twisted or cutting blades, and the application of this hollow cylinder to the purpose of receiving the blades, for the constructing of shearing machines."

To make the ledger blade of the required stiffness, there is to be a cast iron frame of great strength, and, of course, of such length and width as may be necessary, according to the size of the cylinder to be used. The cutting portion of the under, or ledger, blade, of plate steel, is to be riveted to a stiff cast iron support, of the length of the frame, in such a way as to admit of its being adjusted to the revolving cylinder. The ledger blade is not to be perfectly unyielding, although it is to be stiffer than it has heretofore been used.

The cylinder for a narrow machine, of about three feet, may be a solid iron bar, of two inches in diameter. For a wider machine, it may be made of sheet tin, copper, or other metal, and be from three to five and a half inches in diameter, and furnished with a suitable number of blades.

The method of grinding the ledger blade, and those on the revolving cylinder, is this: after making them as true as possible in any of the ordinary ways of grinding, they are to be put into their places in the machine, with adjusting screws to bring the ledger blade against the cylinder; a rapid motion is then to be given to the latter, which motion must be continued until they are perfectly fitted to each other; emery, or other suitable substance, being used in the grinding.

Whether the foregoing modes of procedure are perfectly new, or to what extent they are so, we leave to the experience of those in the habit of using, and keeping in order, the kind of shearing machine to which they refer.

13. For *Machinery for making Wrought Nails;* Reuben Daniels, Woodstock, Windsor county, Vermont, May 13.

The claims in this machine are, "1st. The apparatus and principle of cutting off the nail rod as it comes hot from the fire.

"2d. The application of Stephen J. Gold's patent dies for making wrought nails, as applied to a reciprocating, instead of a rotary, motion.

"3d. The heading apparatus, as effected by means of a cam attached to the driving or balance pulley.

"4th. The method of constructing and hanging the cylinders to which the dies are attached.

"5th. The method of altering the length of the pitman."

We do not think it necessary to compare this machine as described, with those for making wrought nails which have preceded it, and of which there is a considerable number, although, we believe, not more than one or two of them are now in use. Should this be more fortunate, and make good wrought nails with sufficient rapidity, it will afford prima facie evidence that there is enough of originality in it to entitle it to the protection of a patent.

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14. For an *Auger twisting Machine;* Oliver Snow, Meriden, New Haven county, Connecticut, May 13.

This machine is constructed very much like some of those made for cutting screws upon bolts, in which the bolt is held by a suitable clamp, and turned by a wrench in its passage through the cutting dies. A mould is made, which consists of two parts, hinged together at one end, and having a contrivance by which these parts are held firmly together when closed. This takes the place of the dies in screw cutting machines. When the mould is closed, two semi-cylindrical grooves, one in each half, combine to form a cylindrical opening, having a spiral thread sunk in them, to receive the two flattened edges of the metal, which is to form the twisted part of the auger. There is a clamp to receive the shank of the auger, and this clamp has a cylindrical shaft behind it, upon which is cut a thread, or spiral, corresponding with the twist to be given to the auger, and working through a nut which causes it to advance and retreat with the requisite speed, when turned by the handle, or winch.

"The most important parts of the machine are the die, or mould, and the spiral screw, and the adaptation of the die and spiral screw to each other. I therefore claim as my invention, the construction and use of the die, or mould, for twisting an auger, or bit, of any size, as above described; to the residue of the machine, I make no claim."

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15. For a *Machine for Boring out the Hubs of Wheels,* and the opening for the boxes and lynch cup; John R. Morrison, Springfield, Jefferson county, Ohio, May 13.

A bench is to be made, on the centre of which, one end of the hub to be bored is placed, concentric circles being made as guides

in so doing. A cast iron frame is placed on the upper end of the hub, and is confined there by bolts which reach down to the bench, the frame being so placed as to stand with its centre exactly over that of the hub; a vertical shaft, running in suitable collars, receives at its lower end, bits, or cutters, of any desired size; this shaft is turned by a handle, or cross bar, at top. The hub may be bored half way through, and then reversed, and cutters of the proper size for the boxes, &c., may be used to enlarge the holes; the claim made is to the whole machine. The patentee is, of course, confined to the particular construction which he has described, and which we have not thought it necessary to give in detail. Such machines may be varied in numerous ways; several patents have been obtained for them under different forms, and twenty persons may yet claim to be inventors of certain special appendages, or modes of construction, which may, or may not, be improvements.

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16. For a *Balance Pendulum;* Hiram Twiss, Meriden, New Haven county, Connecticut, May 13.

After describing the pendulum, the patentee says, "I do not claim as my invention, a balance pendulum, as such; but I claim as my invention and improvement, the mode of suspending the same as above described; whereby, first, the weight is placed on a single bar below the centre of motion, thereby producing a repelling action in the balance. Second, in vibrating on knife edges, or points, whereby the friction is greatly reduced. Third, in constructing it with a regulator, by means of which, the effects of heat and cold on the metal is counteracted, and also by means of which, the spring of the balance pressing on the sides of the sockets of the regulator, assists the recoil of the balance when at the highest point of vibration, and most disposed to remain at rest."

"The balance pendulum above described is calculated for, and I regulate it so as to give, forty-five strokes in a minute; whereas the suspended pendulums in common use usually give ninety. This invention will lead to useful improvements in the construction of all time pieces regulated by the vibrations of a pendulum."

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17. For improvements in the *Construction of Clocks and Time Pieces;* Hiram Twiss, Meriden, New Haven county, Connecticut, May 13.

The improvements described in this specification depend, in a great degree, upon the introduction of the balance pendulum, the time wheels being so altered as to answer to the slower motion of the pendulum; and the patentee says that, "with these alterations in the time wheels, my improved clock will move with much less friction, and with the weight on a single cord not exceeding, and probably less than, half the required weight on a double cord now used in eight day clocks."

The balance pendulum is here again particularly described as in the foregoing patent, together with the mode of constructing the re-

gulator; but we cannot afford the space required for their insertion. Certain improvements are also claimed in the striking part, which also we shall pass over, excepting so much of them as may be indicated by the claims, which are the following:

"I do not claim a balance pendulum, as such, to be my invention; but I do claim as my invention and improvement, the successful and advantageous application of the slow motion of the balance pendulum to the movements of any portable wooden clock, or timepiece.

"I do claim as my original invention, the regulator as above specified; whereby the motion of the pendulum is controlled by a spring, and its expansion and contraction counteracted.

"I also claim as my invention and improvement, the construction of the striking part as above specified, whereby the fly is made to revolve backward and forward by means of the lever on the verge shaft, and its connexion with the fly as above specified; thereby checking and controlling the hammer more perfectly, and with less loss of power, than can be done by a continued revolution of the fly as in common use, and so requiring less weight, and less space for the descent."

We do not perceive the necessity for two patents for the foregoing improvements, as the whole appertains to the same instrument, a time piece, and the first, the balance pendulum, is specially mentioned as applied in the second patent.

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18. For an improvement in the machinery for *Breaking, Fleshing, and Unhairing Hides*; Johnson Dunaway, Woodville, Rappahannock county, Virginia, May 13.

The description of the machine here patented is very obscure, and the drawing, though a well executed perspective, does not serve to show its construction and operation with sufficient clearness; possibly, by making a study of it, we might unravel it, but for this we lack both time and inclination. The claim is to the whole machine.

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19. For a *Churn;* James Guston, New Petersburgh, Highland county, Ohio, May 14.

A rectangular box, or trough, is to be made, and two wheels, with dashers, or buckets, like those of paddle wheels, are to cross this box from side to side; they must run clear of each other, and of the bottom and sides of the box; one gudgeon of each wheel is to pass through one side of the box, and to be connected together by means of whirls, and a band; so that on turning one of them by a crank, they will both be set in motion, and the churning effected.

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20. For a *Thrashing Machine;* Amos Parker, Portland, Cumberland county, Maine, May 14.

All that we learn from the specification and drawing of this patent is, that a horse power, consisting of an inclined floor with iron trucks, or wheels, running upon ways, is to be geared to a machine for

thrashing grain, this latter having iron teeth, and a suitable concave.

We are led to the conclusion that the horse power and the thrashing machine are two machines, and, therefore, if they were new, that they would require separate patents to secure them; but as they are both old, and such machines have been frequently combined together, we know not upon what pretence the patent was obtained.

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21. For *Stoves and Grates for Warming Rooms;* William Mix, Prospect, New Haven county, Connecticut, May 14.

Although the particular arrangement of the parts of this stove which form the subject of this patent, is intended to be varied so as to adapt them to grates, &c., we shall present them under that which is first described in the specification, and which, we presume, is that which the patentee intends generally to adopt. A cylindrical stove is to be made in the usual form, and within this is placed a second cylinder, constituting the furnace, or fire place. This second cylinder may be about one-half the diameter of the outer one, so as to leave a space between them, and it may be about half its height. Above the inner cylinder is to be a lining of fire brick. A pipe ascends from the centre of the top of the stove, and at the height of a foot, or so, it enlarges into a drum of about a foot in diameter. Between the body of this stove and the drum, there is a valve, or damper, by which the draft may be entirely averted. From the upper side of the drum, a pipe proceeds into the chimney; the door for feeding the fire, and that into the ash pit, are situated as usual. The distinguishing feature is now to be described, and this consists in pipes which connect the drum with the ash pit, or chamber, below the fire. Two pipes may pass out from the drum, horizontally, and then turn down vertically, parallel to the body of the stove, descending until they arrive opposite to the ash pit, or to a chamber below the fire; they then bend at right angles, and enter into this chamber.

When the valve between the stove and the drum is open, the draft will be upwards, as in ordinary stoves; but when this valve is closed, and air is admitted above the fire, the draft will be downwards, through the burning fuel, up the side pipes, and into the drum above the valve.

The claim is to "the machinery and apparatus above described, causing the reverberation of the fumes through the chamber around the furnace, and the great discharge of heat below the combustion in the furnace, by means thereof."

The stove patented by Mr. Atwood, of New Haven, (see No. 29 for last month,) although differing from this, bears so strong a resemblance to it, as to give the idea of some near relationship between them.

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22. For a *Rotary Stove;* Elisha Town, Montpelier, Washington county, Vermont, May 15.

A fire place proportioned to the size of the stove, is to have an

oven situated behind it, with a draft above and below the said oven, for the heated air. There is to be a circular projection on each side of the plate which covers the oven, and a part of the fuel room; and upon the upper side, and near to the edge, of this plate, a circular rim is to rise sufficiently high to allow a portion of the heated air to pass to the flue, over the oven, and also allow room for the bottoms of the boilers, &c., which fit into openings in the top plate, to pass over the oven. A large circular plate is placed over the fuel room. The patentee says that, "For the above described plates, I do not desire to claim them as a part of my invention."

Above the said circular rim, and resting upon it, is a circular rotary plate, which projects a little beyond it, and may revolve on a centre pivot projecting down through the bottom plate. This plate has openings in it for boilers, and may be turned by means of a lever adapted to the purpose.

"The principle for which I claim the invention, and for which I would ask letters patent of the United States, is the revolving top plate or fixture, into or on which are placed the principal utensils used in cooking, and for other purposes to which the stove may be applied."

The taking of this patent is altogether a strange affair, as the foregoing claim is in the precise words used by Henry Stanley, of Vermont, who obtained a patent for a cooking stove on the 17th of December, 1832; see vol. xi. p. 381. That stove has a rotary top, and contains what the present patentee does "not desire to claim;" yet he has desired to claim, or has claimed contrary to his own desires, the same things in the same words used by Mr. Stanley. A patent for another cooking stove was obtained by Mr. Town on the 16th of December, 1833, one year after Stanley's; but in this he says nothing about a rotary top plate; see vol. xiii. p. 390.

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23. For *Water Wheels for driving Mills;* Benjamin Dugdale, city of Trenton, New Jersey, May 15.

This is to be a horizontal wheel with hinged buckets, acted upon by the tide, or the current of a river. The buckets are to be checked by a chain, or otherwise, so that they may close in one direction, and not open too far in the other. This poor contrivance has been tortured into many forms, but under the whole of them it has been perversely disposed, disappointing the fond hopes of its progenitors. Much is expected from this last born of the family, as we are told that "This water wheel may be applied to many purposes; amongst which is that of raising great weights, and also for raising vessels that are sunk, &c. &c., for which purpose it may be secured between two vessels of sufficient size to sustain the weight to be raised, and the power multiplied by cog wheels, or a system of wheels, or by screw and cog wheels geared to said water wheel, or the shaft thereof." These are floating ideas, which, as waking dreams, may be entertained without much cost; but which, if attempted to be reduced to practice, would arouse the projector to a knowledge of unwelcome realities.

24. For an improvement in the *Stop Motion of the Drawing Frames used in Cotton Spinning;* Lewis Cutting, Lowell, Middlesex county, Massachusetts, May 15.

Instead of that arrangement in the ordinary drawing frame, by which the latch operates in throwing the driving belt on to a loose pulley when the lap leaves the conductor, by breaking or running out, a straight steel spring is substituted for the latch, and this is notched at one end, so as to hold in a corresponding notch made in the end of the rod to which the spiral spring is attached, and connecting the straight spring with the revolving rod; so that, when it has let the rod and spiral spring at liberty, the spring, by its backward motion, acting on the revolving rod, and that on the foot of the wire which supports the conductor, will cause the latter to resume its upright position; thus saving the time which, in the old mode, is required to replace it by hand. The claim is to "the application of a spring to operate on the conductor as above described, or as may be found most convenient to cause it to resume its upright position, after it has thrown the frame out of gear."

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25. For a *Double Power Mill, or Machine;* Luther Copeley, New Lebanon, Columbia county, New York, May 15.

This contrivance, the petition informs us, is made by one of the people called Shakers, a people who are in the habit of making many good things, but who, like those of other sects, are also capable, as it plainly appears, of making mistakes; and we think, in more senses than one, sometimes cheat, or attempt to cheat, nature out of her dues, notwithstanding their proverbial honesty. We have before us one example of this, "in the construction of a mill or machine wheel, and the application of water, wind, or steam, thereto, as the propelling power, by which *the same power is used twice*, and a double power obtained."

We shall not attempt to give the construction of this machine in detail, but only explain the principle upon which it is to violate all principle, by generating double power. There is to be a horizontal wheel which is to have floats, or buckets, pendent from its lower side. The shaft of this wheel is to be double, the outer part forming a tube within which the inner shaft is contained, so that they are capable of revolving in reversed directions. The water, wind, or steam, is to be passed through the step, or lower gudgeon, which is hollow, into a space between the hollow and the tubular shaft; and from the latter, it is to pass through a trunk, or tube, at right angles to it, and from which it issues upon the floats of the wheel, escaping laterally; so that this hollow trunk shall operate like that of Barker's mill, whilst the water, &c. issuing from it, propels the float wheel in the opposite direction. We have not time to attend to those who do not know enough of mechanics to see the fallacy of this contrivance. Something like it, *in principle*, may be found at p. 250, No. 64.

26. For a *Cultivating and Tilling Machine;* Joseph D. Prescott, Chesterville, Kennebec county, Maine, May 15.

This is the common, triangular harrow, or cultivator, with three irons in it; the front one operating like a double mould board, in opening a furrow; and the two back ones, called furrowers, being made to shift, or twist round, so that they may throw the earth in towards the centre, or out from it, as may be desired. "A patent is claimed on the furrowers only, which may be changed from right to left, as above; also directly forward of the furrowers, cutters may be set to use at will, as the soil may require."

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27. For a *Fender for protecting the Bows of Vessels;* William Johnson, Louisville, Jefferson county, Kentucky, May 15.

Two casings are to be made to the bows of the vessel, one of which is to be firmly fixed to the vessel itself, and the other, or outer one, is to stand at a suitable distance from it; between these two casings, are to be placed spiral steel springs, forcing them apart, but capable of yielding when the outer casing strikes against any resisting article. Check chains are to be used, to keep the outer at a proper distance from the inner casing; and bolts attached to the former, are to slide into holes in the vessel's bows, to guide it correctly. The claim is to the whole apparatus.

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28. For *Manufacturing Napped Hats;* Lemuel Lyon, 2d, Needham, Norfolk county, Massachusetts, May 15.

The waste material known amongst hatters under the names of "podgum," "strikers," or "skimmings of the kettle," which consists of fibres of cotton, hair, and fur, and has heretofore been thrown away as useless, the patentee preserves, dries, and works in with wool, so as to make a component part of the bodies of hats to be napped. The claim is to "the converting to use, as above described, this *podgum, striker, or skimmings of the kettle.*"

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29. For an improvement in the *Loom for Weaving Carpets, and other figured Cloths;* John Haight, Harsimus, Bergen county, New Jersey, May 17.

We cannot pretend to epitomize this specification, which is of great length, and refers to the drawings; but a general idea of the improvements which it describes, may be obtained from the following claim:

"I claim specifically as my invention, the polygon for holding and changing the shuttles; the double shuttle boxes, and manner of changing them to the slay, and the application of the cam to raise the uprights and work the engine; and the general arrangement and combination of machinery by which the several movements are effected."

30. For *Water Proof Boots and Shoes, from India Rubber Leather, or India Rubber Cloth;* Edwin M. Chaffee, Roxbury, Norfolk county, Massachusetts, May 17.

(See specification, at p. 341.)

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31. For a *Press for Cotton,* and other Substances; Robert Triplett, Daviess county, Kentucky, May 19.

The power in this machine is applied by means of an iron screw placed horizontally, and having on each of its ends a follower, which followers are alternately forced up against the article to be pressed. The screw is made to traverse backward and forward by means of an iron cog wheel, which operates as a nut, having a female screw through its centre, which fits on to the horizontal screw; a crown wheel upon a vertical shaft, gears into the teeth of the nut, or cog wheel, to give it motion, and as this nut turns between stationary collars, the screw traverses, without turning. The vertical shaft may be turned by horse, or other power. The collars, or bearings of the respective parts, we need not describe, as any competent workman will readily understand how to adapt them to the other parts. The boxes, and other provisions for forming the bales, may be similar to those generally used in cotton presses.

It is intended, sometimes, to make the cog wheel fast upon the shaft of the iron screw, so that the latter may revolve without traversing backward and forward; in this case, the screw works in a nut fitted to a frame, or bale, attached to each follower, in such a manner as to allow the requisite room for the traversing of the screw between the nut and the follower.

This modification of the machine, as well as its general construction, is distinctly described and claimed, and we think that there is sufficient novelty in the general arrangement, as claimed, to sustain the right of the patentee.

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32. For a *Machine for rolling and cutting Crackers and Biscuit*; Daniel Poole, Dauphin county, Pennsylvania. First patented December 24th, 1824. Patent surrendered, and reissued upon an amended specification, May 20.

In the original specification, the parts were particularly described, but nothing claimed, which omission is supplied in the new specification. The general construction of the machine is as follows. There is a bench of sufficient length to sustain the apparatus, say six feet, its width depending upon the number of cutters to be employed. The dough is placed upon an endless feeding apron, by which it is carried to rollers, in passing between which it is brought to the proper thickness. From them, it passes under a row of tubular cutters, which are worked up and down by means of a crank. These cutters are furnished with prickers, and with a clearer, by which, as they rise, the cracker is forced out of them. The bed upon which they are to be cut, is made of lead, and the whole cutting apparatus is

inclined at an angle of about fifteen degrees from the perpendicular; this, we suppose, is to cause the crackers, when cut, to slide on to a second endless apron, upon which they are carried from the machine.

The claims are to the rolling of the dough between the rollers, without any intervening material to roll it on, and to the joint operation of rolling and cutting as described.

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33. For a *Steam Boiler;* Levi Burnell, Elyria, Lorain county, Ohio, May 21.

We cannot easily describe the construction of this boiler, without the drawings, but we may afford some general idea of it, which is as much as we think necessary, not viewing it as any improvement upon those generally used. The boiler is to be in the form of a vertical cylinder, terminating at top in a cone; in the inside of it there is to be an inverted cone, the bases of the two uniting at the top of the cylindrical part of the boiler, which is to be the water line. There is to be any desired number of cylindrical boilers within the outer case, each of them being formed of two concentric drums, placed an inch or two apart, and united by suitable rims. The furnace is to be a vertical cylinder in the centre of the boilers, and the draft from it is intended to pass alternately up and down, over and under the respective cylindrical boilers, until it arrives at a proper place of exit; the concentric boilers being so placed as to admit of its so doing, whilst they all communicate by tubes with the steam chamber above.

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34. For *Propelling Boats on Canals and Shoal Water;* Levi Burnell, Lorain county, Ohio, May 21.

Wheels with notched, or indented faces, and shod with iron, are to be placed on shafts inclined towards the stern, on either side of the boat, which shafts are capable of rising and falling to suit the inequalities of the bottom on which the wheels are to run. They are to be made to revolve by proper gearing connected with a motive power in the boat.

By searching among the American patents, we could find one for an apparatus similar to the foregoing, but do not think it necessary, as we can go much further back, and probably even to the origin of this invention, as it dates at a period of upwards of a century back. Among the different machines described in the volumes of the "*Machines approuvée par L'Academie Royal,*" there is a plate and description of this identical wheel, running upon the bottom of a canal, or river. Were it new, however, it would not answer the intended purpose; and among other objections to it, that of its digging up, and disturbing the bottom, would be one of some consequence.

Those who are curious on the subject, and have the means of reference, may examine the 2d vol. p. 25, of the above named work, where, under date of 1702, they will find the description of a "*Machine pour remonter les Bateaux, inventée par M. Martinot.*" It will then appear that this wheel has a fair claim to be placed among the "Modern Antiques."

35. For a machine for *Breaking and Cleansing Hemp and Flax*; Robert Miller, Glasgow, Barren county, Kentucky, May 23.

We have not examined the list of patents, but presume from the wording of the claim that this is taken for improvements upon a machine previously patented by the same person, as he says, "To my original invention is now added ten improvements, (for which, only, a right is claimed.) 1. Cogs in the form of an inclined plane; 2. Cast iron friction wheels; 3. Iron faced blocks; 4. stuffed head blocks; 5. Guards for the spring poles; 6. Regulators on the brakes; 7. Movable slats and their forms; 8. Finishing brakes of equal swords, both for the machine and hand; 9 Cleaning the offal; 10. Adjusting the triangles."

Whether all these, including friction wheels, movable slats, &c., are new, and patentable, we shall not now stop to inquire; there are others, we presume, who can reply to a question upon the subject.

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26. For an improvement in *Bedsteads;* Robert Miller, Glasgow, Barren county, Kentucky, May 23.

Some pains have been taken with this and the preceding specification, and the drawing accompanying them are pretty well executed; yet they fail in giving a clear idea of the particular things intended to be patented. So far as we are able to judge respecting the bedstead, the rails are to be united to the posts by means of irons dropping into each other, in a manner not very unlike many other bedstead fastenings. The sacking bottom is to be tightened by revolving iron bars, or rods, placed within the rails, and extending their whole length, they having journals turning in proper holes, and ratchet wheels and palls to hold them in their places. The patentee, who ought to know its value, praises the affair very highly; he says that "it is firm to solidity, durable as wood and iron; nor is there a single invisible lodgment for one of those pestiferous vermin that have so long annoyed the human family; it never needs scalding, whence it is called the *Clean, Firm,* and *Everlasting Bedstead.* As the sailor said by the *everlasting* to make into trowsers, "in that case, let me have enough for two pair."

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37. For *Bellows for Smiths' Forges,* and other purposes; George Lewis Dimpfel, city of New York. An alien, who has resided two years in the United States; May 23.

The claim annexed to the specification of this patent is in the following words. "And I, the said George Lewis Dimpfel, do hereby declare that I do not mean to claim as my invention, any of the parts of the said bellows taken separately, the same being generally known: But I claim as my invention, the shortening of the rock-staff board near the throat; the adding a second, or short body board, with two additional valves, in such a way that the descent of the weight adds to the quantity and equality of the blast; and the general arrange-

ment and combination of the same, for giving a more equal and effective blast of air, as herein substantially set forth and described."

The arrangement we believe to be new, and well calculated to attain the end proposed.

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38. For a *Machine for Breaking and Working Hides;* Josiah Bonney, Cornwall, Litchfield county, Connecticut, May 24.

The proposed mode of working hides is to put them into a common dash wheel, which is to be fourteen feet in diameter, and the heads two feet and a half apart. The heads are to be entire, with the exception of a space on one side, near the axle, for putting in the hides. Slats are to be placed in three or four places, across the wheel, near to its periphery, in order to lift the hides, and cause them to fall down. The same plan, we are told, may be applied to the fulling of cloth; and "What the inventor would by patent secure to himself is, the process of breaking and working hides, scouring leather, and fulling cloth, by a continuous rolling, beating, or falling, in a wheel, or equivalent machine, as above specified and described."

The wheel happens not to be new, although we do not know that it has ever been used for working hides. As to its being substituted for the fulling machine, no idea could be much more fallacious, the process of fulling requiring the continuous action of those powerful beaters employed for that purpose, or something equivalent thereto.

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39. For a *Compound Rotary Steam Engine and Boiler;* Simon Fairman, Lansingburgh, Rensselaer county, New York, May 24.

The description of this engine is one of great length, and we have read it through with as much care as our attention to an individual specification will allow; still we have obtained but an imperfect idea of the apparatus, as it is very complex; and the drawing, although very well executed, represents it in perspective only, without any of those parts in detail which it is attempted to describe in words. This, in fact, is one of those cases in which references to drawings should have been made throughout the specification.

The engine, as its name indicates, is to be of the rotary kind, but it differs essentially from most of the engines of that class, as it is furnished with cylinders and pistons like those of the reciprocating engine, of which cylinders there may be any convenient number; in the drawing before us, four are represented. The boiler is a vertical cylinder, resembling in its construction, and in the direction given to the draft, that named at p. 403, as patented by Levi Burnell. The boiler is to serve as the foundation of the engine, a hollow cast iron column rising from it, through which the steam is supplied; from this, it enters a hollow, horizontal shaft, around which the cylinders and their pistons, &c., revolve; these cylinders are placed on a hub, to which they are attached by their bottoms, projecting out in a radial direction, like the spokes of a wheel. A piston in each of them is to be acted upon at either end, alternately, and the connect-

ing rod from each piston is so arranged as to cause it to concur in giving a rotary motion to the system of pistons; how this is done we cannot attempt to explain, and on this point in particular the specification is inadequate to its purpose.

The things claimed are "the making the boiler serve as the foundation whereon to set the engine, and thereby saving room; and also the main principles of constructing a steam engine set forth in the foregoing specification."

We venture to predict that this engine will experience the fate of a host of its predecessors of the rotary kind, and prove a source of expense, instead of profit, to its contriver. Considerable ingenuity is manifested in its arrangement, but, if no other objection existed to it, its complexity would suffice to forbid its use.

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40. For a *Machine for Sawing Shingles and Blind Slats;* Isaac Drake, Minot, Cumberland county, Maine, May 24.

The specification of this machine would, of itself, form a small volume, from which we will abstract the claims only.

"The specific and useful improvements hereinbefore described, and claimed by me as the first inventor, are the following: 1st. The mode of moving the carriage by screws. 2d. The mode of reducing friction, and guiding the carriage in its movements by the application of friction rollers. 3d. The particular construction of the dogs, and the mode of applying them to the bolt. 4th. The particular mode of changing the position of the bolt, so as to saw different lengths. 5th. The particular mode of keeping the bolt firmly on the carriage, by means of elevating the dog plate, when the bolt is first applied. 6th. The particular mode of setting for the thickness of the shingles, &c. to be sawed."

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41. For an improved *Condenser for Stills;* James Root, Painesville, Geauga county, Ohio, May 24.

This condenser is to be made by taking two sheets of copper, each fifty-two feet in length, and placing them parallel to each other, and not more than an inch apart; studs are to be soldered between these, to keep them at that distance, and their edges are to be bent over and united by soldering, thus forming them into a flat tube, fourteen inches wide. This tube is to be bent in the middle, so as to reduce it to about half the length, the space between the two parts being four inches at the bend, and eight inches at the ends. One of these ends is to be connected with the still, by a tube, at its lower edge; and from a tube at the upper edge of the other end, the vapour is to escape into the ordinary worm. The condenser is to be placed within a vat supplied with cold water, and is to have an inclination towards the still of half an inch to a foot, throughout its whole length, that the fluid formed in it may return by its own gravity.

By this arrangement, alcohol of a very high proof can, it is said, be obtained in the first running, and that with great economy. The claim is to "the constructing of the worm, or condenser, flat, so that

the sheet of steam passing through it shall not be more than one inch thick, and of sufficient depth to allow the ascending steam of spirit, and the descending condensed water, to pass along the condenser without interfering; and in putting in the studs to prevent the collapsing of the condenser." "It may be made straight, circular, zigzag, &c.; the principle is the same."

This claim cannot, certainly, be sustained, condensers formed of flat tubes having been made, and more than one of them patented.

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42. For an improvement in *Boats;* Rufus Porter, Billerica, Middlesex county, Massachusetts, May 26.

The patentee says that his boat is so formed as to be a pointed spheroid; that it is to be made of staves like a barrel, brought to a point, the staves being secured to round disks of timber, by bolts, spikes, or screws. The proportion of the length, to the diameter, should be as twenty to one. Two of these may be taken, and secured at a proper distance apart; a superstructure is to be erected above them, and a paddle wheel may play between them.

"The point which I claim as original in this invention, is the peculiar shape, or figure, of each single boat, applied as above, whether solid or hollow."

See the specification of Mr. Burden's boat, vol. xiv. p. 195, the form of the floats of which was publicly known, by notices in the newspapers, for many months before the patent was obtained for it.

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43. For *Machinery for Making Combs;* Benjamin and William Redheffer, Germantown, Philadelphia county, Pennsylvania, May 26.

This patent is taken for tools to be employed in the getting out and quilling of horn or tortoiseshell, for combs, preparatory to cutting the teeth. These tools consist of revolving steel cutters, or scrapers, and bearing pieces so constructed as to hold and advance the material properly against the cutters. In those for flat, or plane work, the teeth run straight across from end to end; in those for quilling, there must be grooves on the cutters corresponding to the size of the quill to be formed. The different scrapers are to be made to slide on and off the same axle, so that the quilling tools may be readily changed for those of other sizes.

It is much to be doubted whether a patent for revolving cutters of this description can be sustained, as they have been used in the lathe for a variety of purposes for many years; and the application of such tools to the scraping, or cutting, of horn, &c., for combs, does not render them new. It is necessary, in order to justify the obtaining of a patent, to tell what is new in the thing patented, which has not been attempted in the present instance.

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44. For an improvement in the mode of *Cutting out Shoes;* Charles Weston, Salem, Essex county, Massachusetts, May 27.

Knives are to be made in the various forms required for the leather

of the shoe, and with these, fixed to proper blocks, the upper leathers and soles are to be stamped, or cut out.

How old this contrivance may be, we cannot tell; but this we know, that the same thing was patented here twenty years ago, and again about six years since, and also that it has long been in use in Europe. The present patentee is probably not aware of this, but when the thing was patented six years since, the applicant was informed of it, and the machine exhibited to him; on being told that he could not sustain the patent, he replied, "but I can sell rights."

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45. For *Twin Boats;* Charles Harris, Norfolk, Norfolk county, Virginia, May 27.

"My invention consists of two half boats, connected by beams, knees, braces, and deck above the surface of the water, and placed horizontally parallel, or horizontally inclined towards each other." To give the proper form, a whole boat "would have to be divided from stem to stern in a direct line, centrically, and perpendicularly." "I claim, and here assert as stated in the preamble of this description, to be entirely original, and a before unknown, and unused method of putting machinery into operation." Gently Sir; this world is large and old, and the heads which have contrived, and the hands which have executed, have been numerous; the consequence has been, that they have "found out many inventions," so that "new things under the sun" are very scarce, and be assured that your twin boat is not one of the number.

At p. 412, vol. iii., there is a specification in these words: "The improvement consists of two boats connected by one deck. These boats are to be built with the ordinary curvature outside, but straight throughout on the inside. In the space between these two boats, is the wheel by which it is propelled by ordinary steam machinery placed within the two boats. If necessary, two wheels may be used, by having additional machinery of the same kind" We presume that this example may suffice; if not, we have others at our command.

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46. For an improved *Spindle Grinder;* James Wheaton, Machinist, Providence, Rhode Island, May 28.

In its general construction, this spindle grinder is similar to that now in general use, but the mode of connecting the lathe with the carriage, "is claimed as new, as well as the method of grinding it as it moves on the carriage. From the centre of the carriage, or about the centre, lengthwise, and near the edge of it next the grindstone, a stud, or pivot, extends upwards, which is fast in the carriage, but moves easily in a slot in the lathe. The lathe might be turned entirely round on this, were it not for other parts of the machine; its object is to permit it to be partly turned as it moves on the carriage, and at the same time to give it the same motion forward and backward that the carriage has." Weights are used to keep the carriage regularly against the track, and to aid in keeping the latter steady; the use of these is claimed.

47. For an improvement in the *Machinery for Shearing Broad Cloths;* John Davidson, Springfield, Windsor county, Vermont, May 29.

The whole of this machine is very fully described, references being made to well executed drawings, one-fourth of the size of the actual apparatus. The claim is in the following words:

"Although I have described above the whole machine, embracing my said improvements, yet it is to be distinctly understood that I do not claim the whole of the above described machine as new, or of my own invention. But what I claim as new, and all which I claim as such, is, the construction, use, and application of such ledger blade as aforesaid, with a metallic bed and back, fixed and rendered stiff, firm, and unyielding, attached to a metallic frame, in connexion, as aforesaid, with such rotary cutter as aforesaid, and in combination therewith for the purpose of shearing broad cloths from end to end. The great advantage of the above improved machine for shearing broad cloths, is, that it will shear such cloths as well, and much faster, than the machinery now in common use for that purpose."

It will be seen that this machine is from the same neighbourhood as that described in No. 12 for this month, and they have much the appearance of having sprung from the same seed.

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48. For an improvement in the *Application of the Bellows in Smith's Forges;* Ransom Green, Brunswick, Rensselaer county, New York, May 31.

It is proposed to make the forge in the form of a box, which may be three feet square at top, and of the usual height of a forge, the place for the fire being near one edge of the top of the box. The bellows is to be within the box, and its pipe is to be introduced into an iron cylinder, which may be twenty inches in height, and ten in diameter, which cylinder is directly under, and extends up to, the forge fireplace. At the top of it may be a pan, with grate bars, when a diffused blast is required, or the blast may be led in through a pipe on the side, when a concentrated blast is required, as in the using of bituminous coal and charcoal, for welding, &c.

The claims are to "the manner and principle of using grates for burning coal in forges. The manner and principle of communicating air from the bellows into a cylinder or other cavity, so as to apply it in a diffusive manner. The manner and principle of changing this diffusive application of air to one more concentrated. The manner and principle of placing the bellows within the box of the forge; and also the right of applying any of them to forges now in use."

We have a portable forge in which the bellows is situated like that represented in the drawing of this patent, but not with the cylinder, or cavity; and we have seen forges in which the wind is diffused by passing into a chamber beneath the fire, and then up through a grate.

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49. For a machine for *Gumming Mill and other Saws;* Joshua Draper, Harrisburg, Fayette county, Indiana, May 31.

It is now a considerable length of time since we have encountered

a gumming machine, of which so many were formerly patented, and in which there is so little radical difference, as there must be in all of them a suitable bed piece, and a die to be forced down upon it, the two forming the cutters. In the present instance, the die is to be forced down by an oval cam, at the end of a lever, the requisite appendages being attached. There is no claim made.

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50. For a *Horse Power;* invented by Joel Eastman, late of New Hampshire, deceased. Patented by his administrator, John Martineau, of Eldridge, Onondaga county, New York, May 31.

This is a very ingeniously contrived apparatus, the invention of a gentleman whose talent for mechanics was of no ordinary kind, and who, had he lived, would, probably, have found but few equals in a department in which our citizens may be said to excel. His premature death was a real loss to his country, whilst those estimable moral qualities by which he was distinguished, left a void, not easily filled, in the bosoms of those who knew him intimately.

In this machine there is a stationary wheel placed horizontally on a suitable bed, or frame. This wheel has teeth on its inner rim, pointing towards its centre. The lever by which the horse is to draw, crosses the upper side of this fixed wheel, and has, on its lower side, two (or three) smaller wheels, which drop within, and gear into, the teeth of the fixed wheel, and also into a pinion standing between them, on a shaft in the centre of the fixed wheel. On the lower end of this central shaft there is a crown wheel which gears into, and drives a pinion upon, a horizontal shaft, through which motion is to be given to any machinery.

The claim is to the stationary wheel, combined with the smaller wheels which gear into it, and to the pinion in the centre; "the improvement effected by which arrangement, is the advantage of bringing cogs into action on opposite sides of the journal of the pinion, by means of which the stress is taken off the journal, and two or more cogs being brought into action at the same instant, the stress is divided and distributed; thereby diminishing the liability of breaking the cogs; and, in fact, doubling the strength by this arrangement where the cogs are of the same size, and trebling it if three wheels are used. Another advantage resulting from this arrangement, is compactness and portability. These and all other advantages that are derived from this application of the foregoing described combination, however the same may be modified in practice, is claimed in trust for the heirs and legal representatives of the aforesaid lately deceased Joel Eastman."

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51. For a *Machine for Perfuming Dwellings, and Cleansing them of Insects;* Joseph H. Clark, Connersville, Fayette county, Indiana, May 31.

Although we are not so informed, we presume from the construction of this machine, that it is intended to destroy bed bugs by steam; as it is similar to two instruments for that purpose which have been

patented in the United States, and which had been previously described and figured in the London Mechanics' Magazine, and other European journals. A boiler is to be placed in a sort of chaffing dish, or furnace, and the water it is to be made to boil by means of the coals contained in the furnace. A tube is provided to supply the boiler with water, and another to direct the steam where it may be required. The boiler is to be a cylinder three inches in diameter, and ten long, placed horizontally; and with such a boiler, it will require no small care to prevent the water, instead of steam, from escaping.

Upon examining the specification a second time, it appears that the patentee intended to point out the particular use to which he designed principally to apply his machine, and that our first remark stands in need of correction; at all events the description of it would certainly admit of that construction, as will be seen from the following quotation: "to perfum use berguemont or aney other perfum plesant to the smell use peneroyal and steem beds will cloar them of insects."

We are sometimes able to translate as we read, but at other times we are obliged to read a sentence more than once before we succeed in comprehending it fully, and such was the case with the one last quoted.

SPECIFICATIONS OF AMERICAN PATENTS.

Specification of a patent for a Clamp for sewing and stitching Harness. Granted to JOSEPH BURRINGTON, *Burke, Caledonia county, Vermont, May* 2, 1834.

To all whom it may concern, be it known, that I, Joseph Burrington, of Burke, in the county of Caledonia, and state of Vermont, have invented an improvement in the manner of constructing the clamp, used in the sewing and stitching of leather for making harness, and for other purposes. And I do hereby declare that the following is a full and exact description thereof.

I make a trestle, or horse, of a little less in height than that ordinarily employed as a seat, when working at such a machine, the actual seat being upon the widened end of a lever, to be presently described, which serves also to close and open the jaws of the clamp. At or near the middle of the top of the trestle, I affix two upright standards, on the upper end of which I attach, by hinges, or rule joints, the jaws of the clamp. The lever, to which I have already alluded, extends along the trestle, from end to end, working upon a pin, or fulcrum, at that end which is farthest from the seat; and having two rods extending up from the middle of it, which are fastened to staples on the under, or inner, side of the jaws; when the end which is widened out so as to form a seat, is pressed upon, the jaws will be firmly closed, and when the pressure is removed, a spring operating upon the under side of the lever, will cause it to rise, and the jaw will open. This spring may be situated on the under side of the

trestle, and connected with the lever by a rod extending up to it, or it may be placed between the lever and the top of the trestle; a counter weight may also be used instead of the spring, but not with equal advantage. A table, or platform, may be fixed at the off-side of the clamp, on which the work, when requisite, may rest; and this will at the same time, serve to prevent its coming in the way of the lever.

What I claim as my invention, is the manner of arranging the apparatus for closing and opening the jaws of the clamp, by means of the seat, and a spring, operating in the manner set forth; without intending hereby to limit myself to the precise form and manner described, but to vary the same in any way which I may find convenient whilst the general principal remains unchanged.

JOSEPH BURRINGTON.

Specification of a patent for a Fireplace for cooking, and for warming apartments. Granted to JAMES COX, *city of Philadelphia, May* 2, 1834.

To all whom it may concern, be it known, that I, James Cox, of the city of Philadelphia, have invented certain improvements in the construction of fireplaces intended for cooking, and for warming the apartments of a building, and I do hereby declare that the following is a full and exact description thereof.

The fireplace which I use is of the open kind, with a grate for burning anthracite coal; in describing this, I will assign dimensions to certain parts thereof, and of its appendages, without, however, intending thereby to confine myself to such dimensions, but to vary the same as convenience or experiment may dictate, whilst I do not deviate from the principles upon which my invention depends. I shall also describe certain parts, and modes of arranging them, which in their individual characters, are not new, and which, when so considered, do not constitute any part of my claim to invention.

Believing that great advantage in the economy of heat, is to be derived from having a large quantity of fuel in a state of slow combustion, instead of a smaller quantity in a state of rapid combustion, when much of the heat must be carried off by the velocity with which the current of air escapes, I construct my grate larger than usual, and make my other arrangements to correspond therewith: and although I adapt my fireplace to the business of cooking, I construct it so that no part of the apparatus intended for that purpose, shall necessarily be permanent, but that this may all be removed, and leave it with the ordinary appearance of a grate in an open fireplace.

The opening for the fireplace may be three feet square: that is to say, three feet from the hearth to the arch, or breast, of the chimney, and three feet from jamb to jamb. The grate may then be eighteen inches long, twelve inches in height from the bottom bars to the top, and nine inches from front to back. The back of the grate is to be of soap-stone, or some similar material; but above the grate, the back and sides may be formed of cast iron plates, placed vertically; the

sides are to form an obtuse angle with the back, so that a line drawn from the centre of the grate in front, to the junction of the back and side plates, would form a right angle, or nearly so, with the latter. The space between the grate and the side plates of the jambs, is to be finished off horizontally, and on a level with the top bar, recesses being thus formed upon which articles to be kept warm are to be placed. Below the grate, I intend, in general, to place bars, or grating, to allow the ashes to fall through into a receptacle in the cellar.

The air which is to be admitted into the room to supply the waste by combustion, passes, in the first instance, through an opening in the wall at the back of the fireplace, where the outside of the wall admits of it; and, if otherwise, it is admitted from the cellar, or through tubes under the floor, from the outside of the house, into a space between the back wall of the chimney, and the soap stone, or fire clay, slab which forms the back of the grate, already mentioned; this slab descending down as low as the hearth, for the purpose of forming this hollow chamber, which is as wide as the back of the grate. The space between the slab and the back wall, at the upper edge of the slab, or the level of the top of the grate, should be about three-fourths of an inch, widening as it descends by the slab, having an inclination forward of about an inch in a foot. The air which is admitted into this space at about the level of the hearth, is heated in its passage up, particularly as it passes behind the cast iron plate behind, and above, the fire. When it arrives at the upper edge of this plate, it is thence delivered into a receptacle placed in the flue of the chimney, where it is more highly heated, in a manner to be now described.

The flue of the chimney I make large, say of the whole width of the fireplace, three feet and nine inches in depth, in order to allow of my placing therein the receptacle, or air heater, above alluded to. This I make of copper, iron, or other suitable metal, of such size that it shall fill up the whole depth of the flue from front to back, and of such width as to allow a space of three or four inches, more or less, on each side of it, for the passage of smoke and heated air from the fire. The air heater may be three or more feet in height, and may extend down to within three or four inches of the arch, or breast of the chimney. The lower end of it is closed, with the exception of that part of it by which the air from the hollow back, before described, is to be admitted into it. I have stated that the upper part of this hollow back is formed by a plate of cast iron placed at a small distance, say three-fourths of an inch, from the brick wall. There is a corresponding opening along the back part of the lower end of the air heater, so formed and fitted, that when it is properly fixed, the whole of the air which rises through the hollow back, will pass into it, without admitting any portion of that which rises from the combustion of the fuel. The air does not enter immediately into the body of the heater, but passes along a cavity formed by making the bottom and sides of it double, to within a few inches of the top, by which it is compelled to pass up along the sides, and is thereby ex-

posed to the heating influence of the air from the burning fuel. By this arrangement a large portion of the heat which, under ordinary circumstances, escapes up the chimney, is communicated to the air within the heater; and a tube from this, passing through the front of the chimney into the room, will warm the room, and supply what air is necessary for the draft of the fire. Tubes may also be employed to conduct the warm air from it into other apartments.

The heat may be still further economised by having hollow ends, as as well as a hollow back, to the grate and fireplace, into which cold air is to be admitted from without, whence it may supply the draft through holes made for the purpose, below the grate. This, however, I am aware, has been previously done.

Valves, or dampers, are to be employed to close any of the openings when it is necessary so to do, to regulate the quantity, and direct the course of the air which is to pass through them.

For the purpose of baking, I construct a portable oven which is to be set over the fire, and removed therefrom at pleasure. The front of this oven occupies the whole space of the fireplace from the grate to the breast, and from jamb to jamb, its bottom resting on the flat cheeks on each side of the grate. The general form of this oven is the same with that which is usually made of sheet iron, and set into the jambs of kitchen fireplaces. Like these, also, it is made double at the bottom, sides, and back, that the heated air may freely circulate around it. The inner part is made separate, and capable of being drawn out from the outer; these parts, therefore, may be removed from, or put into, their places separately; and the objection to the weight of the whole together, thus obviated. I intend to make this oven in part of cast, and in part of sheet iron. The lower side of the outer case, for example, will be best formed of a plate of cast iron, as it is to come immediately over the coals. Its ends will rest on the cheeks of the grate; two openings, extending nearly from front to back, admit the heated air from the burning fuel into the spaces between the two cases, and an opening at top, to be regulated by sliding valves, or dampers, allows it to escape into the flue. On the cast part, such projecting rims, or flanches, are to be formed as may be necessary for the joining of the sheet iron thereto, or for other purposes. I allow the oven to be two or three inches deeper than the fireplace, making, on the front plate, a rim which projects back to this distance, to close the opening therein. I am thus enabled to give a sufficient depth to the oven, to receive dishes as large as are ordinarily required in families.

What I claim as my invention in the construction and arrangement of the within described fireplace, and its appurtenances, is, the employment of a receptacle, or air heater, such as I have described, within the flue of the chimney, whether the same be made exactly in the form and manner set forth, or in any other in which it operates upon the same principle, and produces similar effects; I do not, in this, intend to claim the mere insertion of a hollow metallic vessel within a chimney, for the purpose of heating air, and conveying it into an apartment—that having been before done, but I limit my

claim to the improved form and construction thereof, by which a much larger portion of heat is saved than by any of those formerly known. I also claim the employment of a portable oven, such as I have described, to be placed over an open fire, and to be used in the manner, and for the purposes set forth; and likewise, the general construction, arrangement, and combination of the various parts of the fireplace and the apparatus described, as contributing to the general effect intended to be produced by the particular parts.

JAMES COX.

Remarks by the Editor.—Although there is nothing new in the general principle of introducing air from without, and warming it by the waste heat from the fire, we are of opinion that there are, in the above, some points in the general arrangement of the whole, which must be productive of decided advantage. We entertained the idea that a grate placed in a sitting room, and provided with the requisite arrangements for cooking, must necessarily be unsightly; we have seen one of them set, however, and were much pleased with its appearance, and think that in those families where it is necessary to economise room, and to turn all the apartments to the best advantage, this fireplace will be productive of real benefit.

Hot Air Blast.

At a meeting of the Chemical Section of the British Association for the Advancement of Science, Dr. Clark gave an account of Mr. Nixon's process for smelting iron by aid of the hot-blast, and exhibited numerical results of the advantages derived from the new process. The saving is so great, that the total amount of coal now necessary to produce one ton of iron, amounts only to two tons and fourteen hundred-weight, whereas formerly it required eight tons and one and a half hundred-weight, being a saving of five tons and eight hundred-weight for each ton of iron produced. This subject was discussed at considerable length.

[*Ed. New Philos. Journ.*

¶ *Report on the Present State of our Knowledge respecting the Strength of Materials. By* PETER BARLOW, *Esq., F. R. S., Corr. Memb. Inst. France, &c. &c.**

[Made to the British Association for the Advancement of Science.]

The theory of the strength of materials, considered merely as a branch of mechanical or physical science, must be admitted to hold

* The volume of reports made to the British Association for the Advancement of Science, in the session of 1833, has just reached this country, and we hasten to lay before our readers the report of Mr. Barlow, on an interesting branch of practical science. This will be followed by Mr. Rennie's report on Hydraulics, considered as a branch of engineering. COM. PUB.

only a very subordinate rank; but in a country in which machinery and works of every description are carried to a great extent, it certainly becomes a subject of much practical importance; and it was no doubt viewing it in this light which led the committee of the British Association, at their last meeting, to do me the honour to request me to furnish them with a communication on the subject. In drawing my attention to this inquiry, the committee have subdivided it into the following heads: 1. Whether, from the experiments of different authors, we have arrived at any general principles? 2. What these principles are? 3. How modified in their application to different substances? And what are the differences of opinion which at present prevail on those subjects?

To these questions, without a formal division of the essay, I shall endeavour to reply in the following pages, by drawing a concise sketch of the experimental and theoretical researches which have been undertaken with reference to these inquiries.

The subject of the strength of materials, from its great practical importance, has engaged the attention of several able men, both theoretical and practical, and much useful information has been thereby obtained. As far as relates to the mechanical effects of different strains, every thing that can be desired has been effected; but the uncertain nature of materials generally will not admit of our drawing from experiment such determinate data as could be wished. Two trees of the same wood, grown in the same field, having pieces selected from the same parts, will frequently differ from each other very considerably in strength, when submitted to precisely the same strain. The like may be said of two bars of iron from the same ore, the same furnace, and from the same rollers, and even of different parts of the same bar; and so likewise of two ropes, two cables, &c. We must not, therefore, in questions of this kind, expect to arrive at data so fixed and determinate as in many other practical cases; but still, within certain limits, much important information has been obtained for the guidance of practical men; and by tabulating such results in a subsequent part of this article, I shall endeavour to answer the leading questions of the committee of the British Association, as far, at least, as relates to experimental results. In reference to theory, it must also be admitted that some uncertainty still remains; but this, likewise, is in a great measure to be referred to the nature of the materials, which is such as to offer resistances by no means consistent with any fixed and determinate laws.

Hence, some authors have assumed the fibres or crystals composing a body, to be perfectly incompressible, and others as perfectly elastic; whereas it is known that they are strictly neither one nor the other, the law of resistance being differently modified in nearly every different substance; and as it is requisite theoretically to assume some determinate law of action, it necessarily follows that some doubt must also hang over this branch of the subject. It is, however, fortunate, that whatever may be the uncertainty on these points, the relative strength of different beams or bolts of the same material, of similar forms, and submitted to similar strains, is not thereby affect-

ed; so that whatever may be the law which the fibres or particles of a body observe in their resistance to compression or extension, still, from the result of a well conducted series of experiments, the absolute resisting force of beams of similar forms, of the same materials of any dimensions, submitted to similar strains, may, as far as the mean strength can be depended upon, be satisfactorily deduced. An examination of these different views taken of the subject by different writers, will, it is hoped, be found to furnish a reply to the other queries of the committee. The first writer who endeavoured to connect this inquiry with geometry, and thereby submit it to calculations, was the venerable Galileo, in his Dialogues, published in 1633. He there considers solid bodies as being made up of numerous small fibres, placed parallel to each other, and their resistance to separation to a force applied parallel to their length, to be proportional to their transverse area—an assumption at once obvious and indisputable, abstracting from the defects and irregularities of the materials themselves. He next inquired in what manner these fibres would resist a force applied perpendicularly to their length, and here he assumed that they were wholly incompressible; that the fibres under every degree of tension resisted with the same force; and consequently, that when a beam was fixed solidly in a horizontal position, with one end in a wall, or other immovable mass, the resistance of the integrant fibres was equal to the sum of their direct resistances multiplied by the distances of the centre of gravity of their section from the lowest point, about which point, according to this hypothesis, the motion must necessarily take place.

The fallacy of these assumptions was noticed, but not corrected, by several subsequent authors. Leibnitz objected to the doctrine of the fibres resisting equally under all degrees of tension, but admitted their incompressibility, thereby still making the motion take place about the lowest point of the section; but he assumed for the law of resistance to extension, that it was always proportional to the quantity of extension. Accordingly, as the one or the other of these hypotheses was adopted, the computed transverse resistance of a beam, as depending on the absolute strength of its fibres, varied in the ratio of 3 to 2; and many fanciful conclusions have been drawn by different authors, relative to the strength of differently formed beams, founded upon the one or the other of these assumptions, which, however, it will be unnecessary to refer to more particularly in this article.

We have seen that each of these distinguished philosophers supposed the incompressibility of the fibres; but James Bernouilli rejected this part of Leibnitz's hypothesis, and considered the fibres as both compressible and extensible, and that the resistance to each force was proportional to the degree of extension or compression. Consequently, the motion, instead of taking place, as hitherto considered, about the lowest point of the section, was necessarily about a point within it; and his conclusion was, that whatever be the position of the axis of motion, or, as it is now commonly called, the neutral axis, the same force applied to the same arm of a lever, will always

produce the same effect, whether all the fibres act by extension or by compression, or whether only a part of them be extended, and a part compressed. Dr. Robinson, in an elaborate article on this subject, also assumes the compressibility and extensibility of the fibres, and, as a consequence, assumes the centre of compression as a fulcrum, about which the forces of extension are exerted, and the resistance of both forces to be directly proportional to the degree of compression or extension to which they are exposed; that is, he assumed each force, although not necessarily offering equal power of resistance, to be individually subject to the law of action appertaining to perfectly elastic bodies. In carrying on the experiments which laid the foundation of my Essay on the Strength of Timber, &c., in 1817, I was led, by several circumstances I had observed, to doubt whether, in the case of timber, this assumption of perfect elasticity was admissible. And as some of the specimens used in my experiments showed very distinctly after the fracture, the line about which the fracture took place, I thought of availing myself of this datum, and of that which gave the strength of direct cohesion, in order to deduce the law of resistance from actual experiments, instead of using any assumed law whatever.

The result of this investigation implied that the resistance was nearly as first assumed by Galileo, and although very different from what I had anticipated, yet, as an experimental result, I felt bound to abide by it, attributing the discrepance to the imperfectly elastic properties of the material. Mr. Hodgkinson, however, in a very ingenious paper, read at the Manchester Philosophical Society in 1822, has pointed out an error in my investigation, by my having assumed the momentum of the forces on each side the neutral axis as equal to each other, instead of the forces themselves; consequently, the above deduction in favour of the Galilean hypothesis fails. This paper did not come to my knowledge till the third edition of my essay was nearly printed off, and the correction could not then be made; but being made, it proves that the law of actual resistance approaches much nearer to that of perfect elasticity, than from the nature of the materials there could be any reason to expect; so that, in cases where the position of the neutral axis is known, and also its resistance to direct cohesion, a tolerably close approximation may be made to the transverse strength of a beam of any form, by assuming the resistance to extension to be proportional to the quantity of extension, and the centre of compression as the fulcrum about which that resistance is exerted. But I have before observed, and beg again to repeat, that by far the most satisfactory data will always be obtained by experiments on beams of the like form, (however small the scale,) and of the same material as those to be employed, because then the law of resistance forms no part of the inquiry, and does not necessarily enter into the calculation, the ultimate strengths being dependent on the dimensions only, whatever may be the absolute or relative resistance of the fibres to the two forces we have been considering.

At present, I have only considered the resistance of a beam to a transverse strain; but there is another mode of application, in which,

again, the law of resistance necessarily enters, and has led to many curious and mysterious conclusions. This is when a force of compression is applied parallel to the length. In the case of short blocks, the resistance of the material to a crushing force is all that is necessary to be known; and in the Philosophical Transactions for 1818, we have a highly valuable table of experimental results on a great variety of materials, by George Rennie, Esq., which contains nearly all the information on this subject that can be desired. But when a beam is of considerable length in comparison with its section, it is no longer the crushing force that is to be considered; the beam will bend and be ultimately destroyed by an operation very similar to that which breaks it transversely; and the investigation of these circumstances has called forth the efforts of Euler, Lagrange, and some other distinguished mathematicians.

When a cylinder body, considered as an aggregate of parallel fibres, is pressed vertically in the direction of its length, it is difficult to fix on data to determine the point of flexure, since no reason can be assigned why it should bend in one way rather than in another; still, however, we know that, practically, such bending will take place. And it is made to appear, by the investigations of Euler and Lagrange, that with a certain weight this ought, theoretically, to be the case; but that with a less weight, no such effect is produced—an apparent interruption of the law of continuity not easily explained, which exhibits itself, however, analytically, by the expression for the ordinate of greatest inflection being imaginary, till the weight or pressure amounts to a certain quantity. Another mysterious result from these investigations is, that while the column has any definite dimensions, and is loaded with a certain weight, inflection, as above stated, takes place; but if the column be supposed infinitely thin, then it will not bend till the weight is infinitely great. These investigations of two such distinguished geometers, are highly interesting as analytical processes; but the hypothesis on which they are founded, namely, that of the perfect elasticity of the materials, is inconsistent with the nature of bodies employed in practice; they form, therefore, rather an exercise of analytical skill, than of useful practical deductions. There is, however, one useful result to be drawn from these processes, which is, that the weight under which a given column begins to bend, is directly as its absolute elasticity; so that, having determined experimentally the weight which a column of given elasticity will support safely, or that at which inflection would commence, we may determine the weight which another column of the same dimensions, but of different elasticity, may be charged with without danger.

M. Gerard, a member of the Institute of France, aware of the little practical information to be derived from investigations wholly hypothetical, has given the detail of a great number of actual experimental results connected with this subject, on oak and fir beams of considerable dimensions, carried on at the expense of the French government —from which he has drawn the following empirical formulæ, viz:

1. In oak beams, $\frac{Pf^3}{3b} = \frac{11784451\,(f + .08)\,ah^3}{1.3}$

2. In fir beams, $\frac{Pf^3}{3b} = 8161128\,ah^3$

where P = half the weight in kilogrammes, a the less, and h the greater sides of the section; f half the length of the column, and b the versed sine of inflection, the dimensions being all metres.

How far these formulæ are to be trusted in practical construction, is, however, I consider, rather doubtful, because they are drawn from a number of results which differ very greatly from each other; and in one case in particular, the result, as referred to the deflection of beams, has been satisfactorily shown to be erroneous by Baron Charles Dupin, in vol. x. of the Journal de l'Ecole Polytechnique, as also by a carefully conducted series of experiments in my Essay on the Strength of Timber, &c. I conceive it, therefore, to be very desirable that a set of experiments on this application of a straining force on vertical columns, should be undertaken; and it is, perhaps, the only branch of the inquiry connected with the strength of materials, in which there is a marked deficiency of practical data; at the same time, it is one in which both timber and iron are being constantly employed. We see every day in the metropolis, houses of immense height and weight being built, the whole fronts of which, from the first floors, are supported entirely by iron or wooden columns; and all this is done without any practical rule that can be depended upon for determining whether or not these columns are equal to the duty they have to perform.

I say this with a full knowledge that Mr. Tredgold has furnished an approximate rule for this purpose; but the principle on which it is founded, has no substantial basis. The extraordinary skill which Mr. Tredgold possessed in every branch of this subject, and the great ingenuity he has displayed in investigating and simplifying every calculation connected with architectural and mechanical construction, certainly entitle his opinion to high consideration; but still, on a subject of such high importance, it would be much more satisfactory to be possessed of actual experimental data. The supposition he advanced was made entirely as a matter of necessity, and I am confident that no one would have been more happy than himself to have been enabled to substitute fact for hypothesis, had he possessed the means of adopting the former. But unfortunately such a series of experiments is too expensive and laborious to be undertaken by an individual situated as he was, having a family to maintain by his industry, and whose close and unremitting application to these and similar inquiries, in all probability shortened his valuable life.*

* Mr. Tredgold's Principles of Carpentry, and his Treatise on the Strength of Iron, ought to be in the possession of every practical builder; besides which two works, he published many separate articles on the same subject, in different numbers of the Philosophical Magazine.

At present, I have referred principally to experiments made with a view of determining the ultimate strength of materials; and with data thus obtained, practical men have been enabled to pursue their operations with safety, by keeping sufficiently within the limits of the ultimate strain the materials would bear, or rather with which they would just break, some working to a third, others to a fourth, &c., of the ultimate strength, according to the nature of the construction, or the opinion of the constructor. But it is to be observed, that although we may thus ensure perfect safety, as far as relates to absolute strength, there are many cases in which a certain degree of deflection would be very injurious. It is therefore highly necessary to attend also to this subject, particularly as the deflection of beams, and their ultimate strength, depend upon different principles, or are at least subject to different laws. Hence, most writers of late date give two series of values, one exhibiting the absolute or relative strength, and the other the absolute or relative elasticities. These values will, of course, be found to differ in different authors, on account of the uncertainty in the strength of the materials already referred to; but amongst recent experiments, the difference is not important; they will also be found differently expressed, in consequence of some authors deducing these numbers from experiments differently made. Some, for example, have drawn their formulæ for absolute strength, from experiments made on beams fixed at one end, and loaded at the other, using the whole length; some, again, from experiments on beams supported at each end, and loaded in the middle, using the half length. Some take the length in feet, and the section in inches; others, all the dimensions in inches; and a similar variety occurs in estimating the elasticity. Also, in the latter case, some authors employ what is denominated the modulus of elasticity, in which latter case the weight of the beam itself, and consequently its specific gravity, enters. These varieties of expression, however, are not to be understood as arising from any difference of opinion amongst the authors from whom they proceed, but merely as different modes of expressing the same principles; indeed, in reply to that inquiry of the committee in reference to this point, I may, I think, venture to say, there is not at present any difference of opinion on any of the leading principles connected with the strength of materials, with the exception of such as are dependent entirely upon the imperfect nature of the materials themselves, and which, as we have seen, will give rise to different results in the hands of the same experimenter, and under circumstances in every respect similar.

As I distinguish the doctrine of the absolute resistance, or strength of materials, which is founded on experiment, from that which relates to the amount and resolution of the forces or strains to which they are exposed, which is geometrical; and as I confine myself to the former subject only in this essay, it is not, I conceive, necessary to extend the preceding remarks to any greater length. I shall therefore conclude by giving a table of the absolute and relative values of the ultimate strength and elasticity of various species of timber and

other materials, selected from those results in which I conceive the greatest reliance may be placed.

Formulæ relating to the ultimate Strength of Materials in cases of Transverse Strain.—Let l b d denote the length, breadth, and depth, in inches, in any beam; w, the experimental breaking weight, in pounds; then will $\frac{l\,w}{b\,d^2} = S$, be a constant quantity for the same material, and for the same manner of applying the straining force; but this constant is different in different modes of application. Or, making S constant in all cases for the same material, the above expression must be prefixed by a coefficient, according to the mode of fixing and straining.

1. When the beam is fixed at one end, and loaded at the other,

$$\frac{l\,w}{b\,d^2} = S.$$

2. When fixed the same, but uniformly loaded,

$$\tfrac{1}{2} \times \frac{l\,w}{b\,d^2} = S.$$

3. When supported at both ends, and loaded in the middle,

$$\tfrac{1}{4} \times \frac{l\,w}{b\,d^2} = S.$$

4. Supported the same, and uniformly loaded,

$$\tfrac{1}{8} \times \frac{l\,w}{b\,d^2} = S.$$

5. Fixed at both ends, and loaded in the middle,

$$\tfrac{1}{6} \times \frac{l\,w}{b\,d^2} = S.$$

6. Fixed the same, but uniformly loaded,

$$\tfrac{1}{12} \times \frac{l\,w}{b\,d^2} = S.$$

7. Supported at the ends, and loaded at a point not in the middle. Then, n m, being the division of the beam at the point of application,

$$\frac{n\,m}{l^2} \times \frac{l\,w}{b\,d^2} = S.$$

Some authors state the coefficients for cases 5 and 6 as $\frac{1}{8}$ and $\frac{1}{16}$; but both theory and practice have shown these numbers to be erroneous.

By means of these formulæ, and the value of S, given in the following table, the strength of any given beam, or the beam requisite to bear a given load, may be computed. This column, however, it must be remembered, gives the ultimate strength, and not more than one-third of this ought to be depended upon for any permanent construction.

Formulæ relating to the Deflection of Beams in cases of Transverse Strains.—Retaining the same notation, but representing the constant by E, and the deflection in inches by S, we shall have,

Case 1. $\frac{32}{1} \times \frac{l^3 w}{b d^3 \delta} = E.$

2. $\frac{12}{1} \times \frac{l^3 w}{b d^3 \delta} = E.$

3. $\frac{1}{1} \times \frac{l^3 w}{b d^3 \delta} = E.$

Case 4. $\frac{5}{8} \times \frac{l^3 w}{b d^3 \delta} = E.$

5. $\frac{2}{3} \times \frac{l^3 w}{b d^3 \delta} = E.$

6. $\frac{5}{12} \times \frac{l^3 w}{b d^3 \delta} = E.$

Hence again, from the column marked E in the following table, the deflection a given load will produce in any case, may be computed; or, the deflection being fixed, the dimensions of the beam may be found. Some authors, instead of this measure of elasticity, deduce immediately from the formula $\frac{l^3 w}{3 b d^2 \delta} = E$, substituting for w, the height in inches of a column of the material, having the section of the beam for its base, which is equal to the weight w, and this is then denominated the modulus of elasticity. It is useful in showing the relation between the weight and elasticity of different materials, and is accordingly introduced into the following table.

The above formulæ embrace all those cases most commonly employed in practice. There are, of course, other strains connected with this inquiry, as in the case of torsion in the axles and shafts of wheels, mills, &c., the tension of bars in suspension bridges, and those arising from internal pressure in cylinders, as in guns, water-pipes, hydraulic presses, &c.; but these fall rather under the head of the resolution of forces, than that of direct strength. It may just be observed, that the equation due to the latter strain is

$$t\,(c - n) = n\,R.$$

Where t is the thickness of metal in inches, c the cohesive power in pounds of a square inch rod of the given material, n the pressure on a square inch of the fluid in pounds, and R the interior radius of the cylinder in inches. Our column marked C will apply to this case, but here again not more than one-third the tabular value can be depended upon in practice.

Table of the Mean Strength and Elasticity of various Materials, as deduced from the most accurate Experiments.

Names of Materials.	Specific Gravity.	C Mean Strength of cohesion on an inch section.	$S = \frac{l\,w}{4\,b\,d^2}$ Constants for transverse strains.	$E = \frac{l^3\,w}{b\,d^3\,\delta}$ Constants for deflections.	Modulus of Elasticity	Remarks.
Woods.		*lbs.*				*Growth.*
Acacia	710		1800	4609000	3739000	English.
Ash	760	17000	2026	6580000	4988000	ditto.
Beech	700	11500	1560	5417000	4457000	ditto.
Birch, common	700		1900	6570000	5406000	ditto.
—— Amer. black	750		1500	5700000	3388000	American.
Box	1000	20000				
Bullet tree	1030		2650	10512000	5878000	Berbice.
Cabacully	900		2500	7437000	4759000	ditto.
Deal, Christiana	680	11000	1550	6350000	5378000	
—— Memel	590	11000	1730	6420000	6268000	
Elm	540	5780	1030	2803000	3007000	English.
Fir, New England	550	12000	1100	5967000	6249000	
—— Riga	750	12600	1130	5314000	4080000	
—— Mar Forest	700	12000	1140	3400000	2797000	Scotland.
Green heart	1000		2700	10620000	6118000	Berbice.
Larch, Scotch	540	7000	1120	4200000	4480000	
Locust tree	950	20580	3400	767000	4649000	S. America
Mahogany	637	8000				
Norway Spars	580	12000	1470	5830000	5789000	
Oak, English { from	700	9000	1200	3490000	2872000	} Results
Oak, English { to	900	15000	2260	7000000	47020000	} variable
—— African	980	14400	2000	9500000	55830000	
—— Adriatic	990	14000	1380	3880000	2257000	
—— Canadian	872	12000	1760	8590000	5674000	
—— Dantzic	760	14500	1450	4760000	3607000	
Pear tree	646	9800				
Poon	600	14000	2200	6760000	6488000	E. Indies.
Pine, Pitch	660	10500	1630	5000000	4364000	
—— Red	660	10000	1340	7360000	6423000	
Teak	750	15000	2460	9660000	7417000	E. Indies.
Tonquin Bean	1030		2700	10620000	5826000	Berbice.
Iron.						
Iron, cast { from	7200	16300	8100	69120000	5530000	} Mean of
Iron, cast { to		36000				} English
—— Malleable	7760	60000	9000	91440000	6770000	} and
—— Wire		80000				} Foreign

French Aerial Ship.

We extract the following notice from the Morning Chronicle of the 14th inst.

An Aerial Ship.—There is now exhibiting on the premises of the Aeronautical Society, Paris, in the Champs Elysees, what might not

unaptly be termed a monster balloon. This novel conveyance consists of a balloon of 134 feet long, 34 feet high, and about 25 feet wide. It is in the form of the air-bladder of a fish, rather wide in the middle, whilst the ends are in the form of pointed cones. A balloon in this shape will meet with six times less resistance than one in a round form; and that which we are now describing is calculated to raise a weight of 6,500 lbs. The car, which is made of wicker-work, painted tri-colour, is sixty-six feet long, and very narrow, with seats, (also made of wicker work,) across it at regular distances; thirty persons could be accommodated in the car, which is fixed *immediately under* the balloon, contrariwise to the plan hitherto followed, which was to suspend the car at some distance below the balloon, to the movements of which it was entirely subservient, without the possibility of giving it any impulse. The material of which the balloon is made, is prepared in such a way as to preserve the gas for fifteen days. There is a rudder at each end of the car; and at each side thereof there are two wheels, to which are attached paddles made of prepared canvass, in light iron frames; these paddles are so contrived as occasionally to present a flat surface to the air, and occasionally a cutting edge, and they are set in rotary motion by means of a handle. The following is the manner in which the new aeronauts intend to cause their balloon to ascend or descend, without throwing out ballast, or expending the gas. In 1787, Baron Scott and M. Meunier, of the Academy of Sciences, observed that the air-bladder in the interior of the body of fishes, possessed the property of permitting them to plunge to the bottom, or rise to the surface of the water, according to whether the said bladder was compressed or dilated. In imitation of this phenomenon, a small balloon is introduced, under the principal one, whereby, according to the quantity of exterior air which is introduced therein, a difference of thirty pounds weight of air, more or less, will be made in the weight opposed to the large balloon. This will place at the disposal of the aeronauts, a powerful means of elevating their aerial ship at will, to the current of air they may find necessary for their purposes. They also have so arranged their paddles, as to enable them to imitate the movements of birds, which do not fly in a direct line, against the wind, but tack, as it were, in the air, by rising and descending in inclined directions. According to this system, the aerial ship will tack, by inclined movements, alternately up and down, as marine ships tack horizontally from right to left, &c. Besides the means of giving the desired direction to their balloon, it would appear that the aeronauts have another method, of which they preserve the secret; but from what transpired in conversation, we imagine it may consist of a sort of bellows of their own invention, whereby currents of air may be created, of sufficient rapidity to form *points d'appui* for each paddle and each rudder. The means of directing this aerial ship, then, are, in a few words, as follows:—The aeronauts would seek for a current of air favourable to convey them in the wished-for direction. If they should succeed in this, they might travel at an average rate of ten or twelve leagues an hour, and often from thirty-five to

forty leagues an hour. If they should find themselves between two winds in different directions, they would advance at the rate of from two to five leagues an hour, or they would remain stationary (lay to) waiting for a favourable wind; in the third place, if they should encounter a foul wind, they would tack, by describing curved lines up and down, like birds that fly against the wind. The aeronauts will of course be provided with a compass, thermometer, &c.; they have also invented an apparatus to serve the purpose of a ship's log-line, which will ascertain the vertical and horizontal velocity of the balloon. They will likewise take with them one of Sir Humphrey Davy's safety lamps, and a phosphoric lantern, which, without running the risk of setting fire to the balloon, will shed a sufficient light to enable the party to read, write, and see the compass, if overtaken by night. The principal projector of this gigantic undertaking is M. Lennox, formerly a superior officer in the French army, and who acted a conspicuous part in politics, during the first two years after the revolution of July. He was to ascend in the balloon on the 15th of August (Friday last) from the Champ de Mars, accompanied by seventeen persons, among whom will be Madame Lennox and another lady. The adventurous party seem very sanguine as to their success, and say they could reach London in six or eight hours, with a fair wind. A number of experiments have been made within the last two years, and all appears to be systematically arranged.

(*From the Globe of Wednesday last.*)

The ship was to have ascended on the 15th instant, from the Champ de Mars, at Paris. Various circumstances caused the experiment to be delayed until the 17th. At about nine in the morning, the gigantic balloon was removed from the place where it had been exhibited, to the Champ de Mars; and from that hour the whole population was in movement. Near to the spot where the balloon-ship was prepared, an experiment had lately been made of a rail-road, or *chemin de fer*; but this did not excite the curiosity of the gay Parisians by any means to an equal degree as did the hardy attempt of the eighteen navigators who were about to go on a voyage for the discovery of a *chemin dans les airs!* Thus the inhabitants proceeded *en masse* to that same Champ de Mars, where so many waxen wings have been melted—so many airy projects exploded!

As noon approached, the reserved seats began to fill, and hundreds of horsemen, private equipages, carts, in short, every possible description of vehicle, flanked by countless thousands of pedestrians, were seen converging from every quarter of the city towards the point of attraction, amidst clouds of dust, and under a sun worthy the meridian of Madras. As the immense masses of curious individuals, however, approached the scene of action, various indications that something had gone wrong presented themselves, in the shape of returning provision carts, freighted with uneaten cargoes, itinerant piemen, with long faces, &c.; and it was speedily ascertained that at about half-past twelve, the balloon, which had been completely inflated, and was floating at a certain height, to which it was confined

by cords, and at the moment when it was being drawn down, in order that the aeronauts might embark in the car, suddenly turned topsy-turvy, and burst with a loud explosion! [*Lond. Mech. Mag.*

India Rubber Carpets.

Having some India rubber varnish left, which was prepared for another purpose, the thought occurred to me of trying it as a covering to a carpet, after the following manner: A piece of canvass was stretched and covered with a thin coat of glue, (corn meal size will probably answer best;) over this was laid a sheet of brown paper, or newspaper, and another coat of glue added, over which was laid a pattern of house papering, with rich figures. After the body of the carpet was thus prepared, a very thin touch of glue was carried over the face of the papers, to prevent the India rubber from tarnishing the beautiful colours of the paper. After this was dried, one or two coats (as may be desired) of India rubber varnish were applied, which, when dried, formed a surface as bright as polished glass, through which the variegated colours of the paper appeared with undiminished, if not with increased, lustre. This carpet is quite durable, and is impenetrable to water, or grease of any description. When soiled, it may be washed like a piece of smooth marble, or wood. If gold or silver form the last coat, instead of papering, and the varnish is then applied, nothing can exceed the splendid richness of the carpet, which gives the floor the appearance of being burnished with gold or silver. A neat carpet on this plan will cost, when made of good papering, about 37 cents a yard. When covered with gold or silver leaf, the cost will be about 100 or 150 cents a yard.

[*Lond. Mech. Mag.*

CELESTIAL PHENOMENA, FOR JANUARY, 1835.
Calculated by S. C. Walker.

Day.	H'r.	Min.				
12	6	53	Im. 5 Gem.	,7,	N158°	V118°
12	7	37	Em.		230°	196°
13	4	46	Em. α' Gem.	,6,	277°	226°
13	9	28	N. App. ☽ and 48 m Gem.	,6,	☽ N. 3′,2	
18	7	19	Im. 3 ν Virg.	,4,5,	114°	72°
18	7	56	Em.		208°	162°
21	14	52	Im. 127 Libræ,	,6,7,	93°	52°
21	15	49	Em.		203°	172°
22	13	34	Im. (1060) Libræ,	,7,	61°	12°
22	14	36	Em.		267°	216°
23	15	55	Im. α' Ophinchi,	,5,	120°	77°
23	16	49	Em.		220°	182°

Notice of Jacquard.

Jacquard, the inventor of the silk weaving machine which bears his name, died recently at Paris. For the last century Lyons produced but plain silks, a kind in which Switzerland and England can successfully compete with, and undersell the French. But Jacquard's invention enabled Lyons to preserve the superiority in figured silks. "If Lyons," says a French journal, "has 32,000 looms, and if each loom does a third more than it did forty years ago—if Lyons preserves its superiority, and extends its trade, despite of Zurich and its new silk fabrics, despite of Crevelt—of Elberfeld—of Austria's doubling its silk manufactures—despite of Saxony and Russia, and of the 40,000 looms of England, she owes all this to Jacquard." Jacquard, notwithstanding, died poor, at the advanced age of eighty-two years. [*Mech. Mag.*

Meteorological Observations for October, 1834.

Moon.	Days.	Therm. Sun rise.	Therm. 2 P.M.	Barometer. Sun rise.	Barometer. 2 P.M.	Wind. Direction.	Wind. Force.	Water fallen in rain.	State of the weather, and Remarks.
				Inches	Inches			Inches.	
⊗	1	53°	68°	30.10	29.80	S.	Moderate.	0.33	Cloudy—rain.
	2	50	75	29.70	29.70	SW.	Brisk.		Cloudy—flying clouds.
	3	54	69	.90	.95	WNW.	do.		Clear day.
	4	50	70	.80	.70	SE.	Moderate.	0.35	Cloudy—drizzle—rain.
	5	48	68	.85	.60	NW.	Brisk.		Clear day.
	6	46	60	30.30	30.25	W.	Moderate.		Clear—lightly cloudy.
	7	42	66	.55	.25	S.	do.		Cloudy—drizzle.
	8	56	64	.10	29.70	SW.	Brisk.	0.03	Cloudy—lightly cloudy.
☽	9	50	75	29.70	29.64	SW.	do.		Clear day.
	10	49	53	30.00	30.00	NW.	do.		Moderate. Clear—frost—clear.
	11	36	54	30.30	.35	SE.	Moderate.		Clear—hazy.
	12	30	63	.20	.13	SW.	do.		Cloudy—rain.
	13	54	62	29.90	29.80	SW.	do.	0.08	Clear day.
	14	38	44	.75	.80	NW.	do.		Clear day.
	15	36	44	30.10	30.15	NW.	do.		Clear—hazy.
	16	29	54	.25	.30	NW. S.	Breeze.		Cloudy—hazy.
⊖	17	40	65	.30	.15	SW.	Brisk.		Clear day.
	18	51	71	29.95	29.85	SW.	do.		Cloudy—rain.
	19	42	57	.65	.65	NW.	do.	0.70	Clear—hazy.
	20	24	47	.74	.80	NW.	Moderate.		Rain.
	21	33	54	30.10	30.30	NW.	do.		Clear day.
	22	33	52	.05	29.90	SW.	do.		Clear day.
	23	44	52	29.90	.90	SW.	Brisk.		Clear—lightly cloudy.
	24	34	52	30.15	30.15	W.	do.		Clear—hazy.
	25	34	52	.25	.30	W.	Moderate.		Clear day.
	26	41	56	29.90	29.60	S.	do.	1.25	Rain.
	27	34	52	.85	.85	NW.	do.		Clear day.
	28	46	56	30.10	.90	W.	do.		Clear day.
	29	33	43	30.20	30.20	W.	do.		Cloudy day.
	30	20	40	.35	.35	W.	do.		Cloudy day.
	31	36	46	.70	.70	NE.	do.		
	Mean	42.38	56.16	30.02	30.01			2.74	

Thermometer.			Barometer.
Maximum height during the month,	75. on 2nd and 9th,		30.70 on 31st.
Minimum	do.	24. on 20th.	29.60 on 26th.
Mean	do.	49.27	31.01

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